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October 3-5, 1979

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Georgia Institute of Technology

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This report constitutes the proceedings of the three day conference on general aviation airport noise and land use planning. Included are advance copies of the speakers' presentations that were available at the conference, a summary of each of the five panels, a noise bibliography, and a transcription of all discussions including audience participation.

The conference was unique in the sense that a diverse group of individuals were invited to attend representing the wide range of constituents of general aviation. They were encouraged to participate by expressing their interests and views and to interact with each other. Because of the novel aspects of the conference and the fact that there is no comparable information available elsewhere, it was determined to reproduce all discussions as accurately as possible. It is anticipated that other conferences of this nature will be held and that this report will provide valuable background and reference information.

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VOLUME II PREPARED PAPERS

3-5 October 1979

Georgia Institute of Technology
Atlanta, Georgia

Prepared For:

U.S. Environmental Protection Agency
Office of Noise Abatement and Control

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FOREWORD

This volume, Volume II, of the report on the Conference on General Aviation Airport Noise and Land Use Planning at Georgia Institute of Technology, October 3, 4, and 5, 1979, includes the 12 prepared papers which were presented at the conference.

Volume I presents summaries of panel discussions held at the conference. Verbatum transcripts of the panel discussions are contained in Volume III together with a glossary of some of the terms used in the discussions.

The verbal presentations at the conference differed in content and format from these prepared papers and there was general discussion of each subject after the verbal presentation.

Sponsored by the EPA, Office of Noise Abatement and Control, the conference was conducted by the Georgia Institute of Technology, College of Architecture, Department of City Planning, Atlanta, Georgia.

The conference attendees were encouraged to participate in a variety of ways. Five panels were conducted during the three-day conference. Each panel consisted of speakers addressing different topics as well as persons with particular interests in the topic area. These persons interacted with the speakers in a panel format. Audience participation was encouraged during each panel session.

These proceedings include advance copies of the speaker's presentation that were available at the conference, a summary of each of the five panels, a glossary, and a transcription of the three-day conference. The transcript includes the speakers' presentations, the panelists' discussions and the audiences' questions and remarks. In some cases, the speakers' presentations differed significantly from their advance copies.

INTRODUCTION

The theme of this conference was General Aviation Airport Noise and Land Use Planning. General aviation (GA) and its network of airports represents the second largest transportation system in the United States, approximately 14,000 airports and 190,000 aircraft.

The purpose of this conference was to examine the development of general aviation airports in relationship to land use planning with four purposes in mind:

1. Identify the status of general aviation activity at present and in the future.
2. Assess the degree to which general aviation may be a noise source.
3. Outline the existing and proposed methods for minimizing general aviation noise.
4. Determine what methods or controls, if any, are necessary to improve the off-airport acoustical environment in the future.

This conference for the first time brought together representatives from a relatively complete group of constituencies or role players having important, though in some cases unidentified, influences in the aircraft noise land use control area. The speakers and panelists participating in the conference included:

13 representatives from noise regulatory authorities; 3 Federal, 5 State and 5 local
13 land use planners working on aircraft noise/land use compatibility; 2 Federal, 1 State, 3 local and 7 private professional planners
7 citizen organizations concerned with aircraft noise/land use compatibility; 2 national, 5 local
5 aircraft industry organizations; 4 national and 1 local
7 organizations representing those interested in land development near airports, including 4 involved in real estate transactions, 1 brokerage firm and 2 real estate appraisers.

The presentations and discussions were noteworthy for their openness and frankness and the general lack of propaganda or defensive positions. Participants were primarily interested in educating other participants as to the way the system works in their particular field. The result was an educational process highly beneficial to all parties involved.

CONFERENCE SUMMARY AND RECOMMENDATIONS

SUMMARY

This conference on General Aviation Airport Planning and Noise Control brought together experts from several professions which have direct impact on these problems. Many of these experts were amazed to find the lack of understanding which exists among otherprofessionals who also work on this problem.

As a result of this conference there appear to be several overall findings generated from the speaker presentations, panelists, and conference discussions.

1. Information Exchange - A strong interest exists in the sharing of airport planning information and experiences which up until now has been either unknown or inaccessible. Many of these participants found they had similar situations and the sharing of information provided the opportunity to begin solving their problems. Education is a basic means by which such an exchange can be achieved.

2. Levels and Descriptors of Noise - General aviation airports are diverse in nature; consequently, there is concern that the aircraft noise descriptors developed for air carrier airports may not be appropriate for general aviation airports. Collectively, general aviation involves a wide ranging number of aircraft types, operations and off-airport land uses. It appears therefore that the present noise descriptors and noise thresholds may not be appropriate in all circumstances.

3. Federal Involvement - The FAA has not consistently addressed the needs of general aviation airports and their planning. Commercial air carrier airports have been the central focus of FAA attention; consequently, changes are necessary to preserve the integrity of general aviation airports and the adjacent airport communities. The roles of all federal agencies in achieving this objective need to be evaluated, particularly, EPA and DOT-FAA.

4. Private Sector Planning - The conference was most effective in identifying what the public sector is doing to address airport noise and land

use. However, the private sector at least equally influences decisions relative to off-airport planning. These areas of activity need further detailing including determining mechanisms by which they may work more in concert with the overall objectives of the airport plan. Without their participation and cooperation solutions to present land use problems will not be achieved, and the efforts of the private sector can be counterproductive.

5. Non-Regulatory Incentive - Certain aspects of regulation remain vital to protecting the public's interest. This protection involves the infrastructure including airport facilities as well as our housing stock. Most protection efforts have involved the regulatory process. Non-regulatory incentives need to be explored to address airport noise planning solutions in a comprehensive manner.

6. Indirect Impacts - The concern for aircraft noise and associated land use cannot be examined in a vacuum. There are other factors beyond noise abatement influencing the operation of airports. This conference identified some of these factors. For example, the relationship of energy conservation to noise control must be examined.

RECOMMENDATIONS

These overall summary remarks suggest several future courses of action. The following are basic recommendations that would provide constructive direction to the problem of airport planning with respect to noise.

1. Airport Land Use Clearinghouse - Currently there is no existing data base that summarizes in a descriptive manner effective ways to implement an airport plan at the local level. A comprehensive data base of land use-related planning techniques need to be developed. The identification and cataloging of such techniques should be assembled and made available to all potential users. A clearinghouse for land use techniques would become a repository for state-of-the-art experiences.

The information would cover several planning areas as delineated below:

A. Land Use

   1. Comprehensive plan
   2. Zoning
   3. Building code
   4. Site design/plat review
   5. Subdivision regulations
   6. Truth in sales - real estate declarations
   7. Other

B. Public Education

   1. Citizen participation processes-public hearings
   2. Other

C. Financial

1. Capital improvement programming
2. A-95 review
3. Taxation
4. Construction and mortage financing
5. Market analysis
6. Appraising
7. Other

2. Centers of Aviation Planning - There is a need for technical assistance to governmental jurisdictions in airport planning with respect to noise. Currently such efforts at best are disjointed. Such Centers could have several functions:

A. Prepare the clearinghouse information on land use planning (as previously described)

B. Develop and coordinate workshops and conferences on airport planning/noise themes

C. Prepare and disseminate instructional materials

D. Establish a cooperative internship/work study program for municipalities requesting services

E. Undertake applied studies/research as requested.

These centers should be associated with universities. It would be imperative that such universities have a potential outreach program with a recognized graduate urban planning curriculum including a transportation emphasis.

3. Airport Planning Conferences - There is a need to pursue this subject further using a conference format. Considerable benefit results from the meeting of role players, involved in this area which cannot be obtained through a clearinghouse format. Such a conference to be successful in the future should be designed to accomplish specified objectives.

A. The following conference topics are suggested by the questions asked and the discussions at this conference. These conferences could consider both air carrier and general aviation airports, perhaps with the two groups at the same conference.

1. Basis for Airport Noise/Land Use Planning.

This would include a review of materials and guidelines developed by EPA, FAA, HUD and others together with sources for funding through various government programs.

2. Airport Noise/Land Use Planning for the Future

This would include a review of predicted aircraft noise in the future and possible long range land use plans using various scenarios with discussions of the desirability and possibility of implementing selected scenarios.

3. Implementing Airport Noise/Land Use Plans.

   This would involve studies of programs for educating the local residents and politicians regarding the need for planning and a review of programs which have been adopted and implemented.

4. Controlling Airport Noise and Land Use.

   This conference could consider aircraft noise regulations, federal, state and local, and land use controls and funding for land use change, federal, state and local. Such a conference could have as an objective the development of proposed legislation to improve the means for achieving airport noise/land use compatibility.

B. The following is a list of topics, some of which should be included in each of the proposed conferences.

1. Effectiveness of Land Use Planning Controls - Specific discussion and case study examples focusing on individual land use elements.

2. General-Aviation Airport Impact - An objective evaluation of the scale of the problem in terms of aircraft types, airports and land use impact.

3. Noise Descriptors - Relevance of present descriptors to adequately assess general aviation airports and off-airport impact.

4. Regulatory Process - Examination of the present Federal regulatory process as a means to minimize the problem of general aviation noise.

5. Public Participatory Process - The role of communities, neighborhoods and the general public in working to resolve airport noise related problems througn the planning process. Included would be a discussion of various formal and informal structures presently in use.

6. Educational Media Programs - An evaluation of effective ways to communicate technical information to non-technical audiences in this subject area using case example.

7. Guidelines for Establishing Effective Airport Noise and Land Use Planning Program - Identify the universal components of an effective plan for abating noise through the land use planning process. Develop this into a model type set of guidelines for use by different types of communities.

8. Airport Noise Impacts - Identify these impacts in terms of general health parameters covering physical, emotional and social well-being effects on a quantitative basis.

9. Cost-Benefit Analysis - Develop a method by which all costs and benefits of general aviation are examined.

10. Effectiveness of Non-Regulatory Controls - The use of public and private sector incentives to minimize airport and land use impact.

4. Continuing Education - Based upon the general resolution of some of the themes, identified through the conference process, a continuing education/short course program should be developed. Such an effort should be aimed at getting essential materials into the hands of local governmental agencies responsible for aviation planning. Supportive educational materials need to be developed and disseminated concurrently with these continuing education programs. Various formats for offering these programs need to be considered.

PRESENTATION BY
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U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
CONFERENCE ON GENERAL AVIATION AIRPORT NOISE
AND LAND USE PLANNING
OCTOBER 3, 1979

Good morning. I want to welcome all of you to this Conference on general aviation airport noise and land use planning. We in EPA hope that this Conference will play a major role in charting the course in general aviation development in the future. Our focus, of course, is noise produced by general aviation aircraft and its impact on neighborhoods surrounding our Nation's airports. Clearly, general aviation does produce noise in neighborhoods across this country. But how much of a problem does this noise present?

Will it get worse in the future?

Are there adequate remedies that could be adopted by affected communities? By the manufacturers of general aviation aircraft? By the general aviation pilots and owners?

Is there a need for Federal regulation in this area?

If the answer to any of these questions is "yes," how soon must action be taken?

These are some of the questions I hope we will talk about during this three day conference.

I would like to take a moment to thank Dr. Clifford R. Bragdon of Georgia Tech for organizing this conference and acting as our Conference Host. Cliff is well known to many of you for his leadership in the field of noise and land use planning. He seemed the perfect choice of a person who could bring us all together to discuss these serious matters in a relaxed and non-adversarial atmosphere.

The U.S. Environmental Protection Agency has been in the noise business since the passage of the Noise Control Act of 1972. That Act laid out a Congressional policy "to promote an environment for all Americans free from noise that jeopardizes their health and welfare." That Act directs EPA to design and carry out a national program to abate and control environmental noise. Because of the Federal Aviation Administration's active role in the aviation noise area, EPA was given an advisory role with regard to the regulation of aviation noise and a regulatory role with regard to all other environmental noise sources.

Those of you who have followed the aviation noise area during the last few years know that we in EPA have focused most of our aviation noise activities on the problem of the commercial fleet. We have made a number of regulatory proposals to the FAA and have been actively involved in the promotion and implementation of noise abatement planning at the Nation's commercial air carrier airports. Significant progress has been made in this area. But, of course, much still remains to be done.

The reauthorization of the Noise Control Act which is now pending before Congress requires EPA to prepare a five-year plan for its activities in the coming years. The mandate is explicit in requiring that EPA update its 1973 Report To The Congress On Aviation Noise as part of this five-year planning exercise. One of the major purposes of this Conference is to provide guidance to us in EPA about our activities in the general aviation area during the next five years and the years beyond.

We have been impressed with the difficulty in the air carrier area of trying to control aviation noise in a situation where the problem is already severe and the order of the day is abatement and retrofit rather than prevention. One needs only to read the newspapers to realize that noise has become a real albatross around the neck of the commercial air transportation system and a major public nuisance for neighborhoods around most of our major airports. The noise problem from general aviation is clearly not this acute, and yet the rapid growth projected for the future for general aviation raises the question whether preventative steps are needed now in order to avoid serious political and economic constraints on the growth of this valuable part of the Nation's air transportation system.

By its very nature, prevention of a future noise problem at general aviation airports would involve many actors, not just the Federal Government. In fact, the major burden for prevention would most probably fall on the private sector and States and localities. Those who would expect the Federal Government to solve this problem would not be, in my view, very good students of contemporary political science. Thus, although we in

EPA have taken the initiative to call this conference, and we want to see what role we might play in this area, the focus of this conference must be much broader: If a preventative program is needed, what mutually supportive roles might a whole variety of parties take in this effort? We in EPA are prepared within the limits of our statutory authority to draft regulations for consideration by FAA in this area, to give financial assistance under the new Quiet Communities Act to local communities and States for airport noise abatement planning, and to continue to help to bring together interested parties for discussion and possible agreement on appropriate courses of action. Deciding whether or not EPA plays such a role, however, is less important for this Conference than identifying whether or not noise from general aviation is a problem today or potential problem for the future and laying out what actions might be appropriate to minimize this problem.

HEALTH AND WELFARE

Any assessment of the potential seriousness of the general aviation noise problem must begin, we believe, with an assessment of the effects of noise on people. It is always surprising, I think, to people who come to review this field from other walks of life, that so much is already known about the effects of noise on people. Although noise as an environmental pollutant is much less in the forefront of popular understanding and support than, say, air and water pollution, noise is the most pervasive of our environmental pollutants and it has, I believe, the longest history. Long before man knew that the water and air he was drinking and breathing were bad for his health, he knew the difference between sound and noise, and he knew he didn't like the noise. Noise is the one pollutant for which nature gave us built-in monitors. In addition, the fear of a loud noise is one of two fears we are born with, and our bodies still react to a loud noise even though we may consciously think we're ignoring it.

This natural aversion to noise has been borne out by subsequent scientific research. Our automatic response to noise has turned out to be quite sensible, but for far more subtle reasons than we originally suspected:

Most of us today are, of course, aware of the impact of noise on our hearing. Millions of Americans today have severe hearing losses because of their exposure to noise. What is perhaps not known by most Americans, however, is that people risk losing their hearing in the presence of much lower exposure levels than they would ever suspect are hazardous. On the basis of the latest scientific evidence, we in EPA have established an average level of 70 decibels over a 24-hour period as the level necessary to protect the public from significant adverse effects on their hearing, with an adequate margin of safety. Those who are exposed to higher levels than this for 40 or more years run a risk of losing some of their hearing. Needless to say, millions of Americans in this country are exposed to levels of noise significantly above 70 decibels, particularly in their employment, but also around some of our major airports.

Of course, noise control ordinances across the country and lawsuits against airport proprietors today are based not so much on a concern for hearing loss on the part of the public, but on something more fundamental: people just do not like noise. It is hard to find words to characterize this aversion to noise. The traditional word of art used by the scientific community is "annoyance," but generally we all use the word "annoyance" to signify something which is not very serious. Those of you who have dealt with angry citizens around airports know that they certainly do not regard aviation noise as some insignificant irritant in their lives, so the word annoyance is certainly a misnomer. As the scientific community has tried to quantify this type of reaction, they have searched for an understanding of its causes. They have found, as you would expect, that environmental noise interferes with normal conversation and a number of relaxing and educational activities on which people put a great deal of value. It also disrupts sleep, and if a person lives in an environment which is continually impacted each night by noise, such as near a major airport, the disruption of sleep can become a serious health problem. Based on these impacts, EPA has identified a day-night average level of 55 decibels as the level necessary to avoid most of these effects.

But recently, scientists have been focusing on an even more fundamental aspect of noise. The "annoyance" reactions that scientists have identified so far may only be the tip of the iceberg, when it comes to the real health effects of noise. Noise is a stressor and the body responds to stress in many subtle ways that we are not conscious of. Noise triggers an automatic response in our bodies which is not controlled by our conscious minds. This probably stems from the fact, as I mentioned, that fear of a loud noise is one of the two fears that we are born with and we never forget it. Outwardly, we may seem calm in the presence of noise, but internally our heart rate goes up, our blood pressure goes up, adrenalin is secreted and our bodies prepare for the "expected" assault.

We in EPA are currently sponsoring a study with Rhesus monkeys at the University of Miami in conjunction with the National Institutes of Health. This study stems from the fact that there are over 40 epidemiological studies from foreign countries which show a relationship between noise and cardiovascular disease. This preliminary monkey study has shown that after several months of noise exposure which is similar to that received by millions of working Americans today, the monkeys have sustained an elevated blood pressure of 30% even after the noise source was removed. It is too early to draw conclusions from this preliminary experiment and further research is necessary, but if noise is in fact tied to elevated blood pressure and possible hypertension, the control of noise may become one of the foremost public health programs in the country since hypertension is directly linked to heart disease and stroke. These two diseases alone account for 48% of the deaths in this country every year.

In short, noise is not something to be laughed at or to tell ourselves that we can get used to. It is a serious health problem, and the evidence is tending to indicate that the effects could be more serious and much more wide-ranging than we ever imagined in the past.

From the point of view of an airport proprietor, it may matter less exactly what the health effects of noise are and more that angry airport neighbors can prevent an airport's expansion and improvement. Their lawsuits and political activity could in the future significantly slow if not stop the growth of the air transportation system. Rightly or wrongly, citizens in this country are becoming less and less tolerant of public officials who make pronouncements that airport expansion is for the public good and that private individuals must give up their property rights and suffer in order that others might fly or otherwise have the convenience of the airport.

So from many perspectives, noise is an environmental pollutant to be reckoned with, and it behooves us to examine the extent to which noise is already a serious problem around some of our general aviation airports and whether or not the growth of the industry will exascerbate this problem significantly in the coming years.

AVIATION NOISE BACKGROUND

What do we know about the noise characteristics of the general aviation fleet? Well, putting aside all military aircraft, there are approximately 185,000 aircraft registered for operation in the United States. Only about 3,000 of these civil aircraft are owned and operated by air carriers as part of the commercial air transportation system. The rest are operated as general aviation aircraft by individuals, businesses, and governments., Most of these aircraft, as you know, are propeller driven rather than jet powered, although jets are gaining a larger share of the general aviation fleet every year.

These 185,000 civil aircraft operate into approximately 14,000 airports in this country. Half of these 14,000 airports are open to the public and about 600 of these are certificated for air carrier operations. It is estimated that today over 130 million operations take place annually at public use general aviation airports with daily operations varying up to about 500 operations. The FAA estimates that operations of these public use airports will almost double to 220 million annual operations by 1987 and that the number of general aviation aircraft during this period will increase from 185,000 to over 240,000 aircraft in the same time period.

Most of the country's attention to airport noise has been focused on about 100 of the larger air carrier airports. Our analysis of these air carrier airports indicates that in 1975 approximately 6 million people were exposed to noise levels of a day-night average of 65 decibels or greater due to air carrier aircraft alone. A number of steps have been taken recently which will bring the number of people exposed to these high levels of noise down over the next several years, with the greatest benefit occurring sometime around the year 1985 when the retrofit/replacement rule will be fully implemented. Unfortunately, because of the growth in the size of the commercial aircraft fleet and increased operations, we can expect the number of people exposed to start going back up significantly after that date. Consequently, we in EPA are actively encouraging further steps to reduce exposure to commercial aviation noise around our Nation's airports.

We know very little about the noise problem at the rest of these 13,000 or so airports which serve the general aviation fleet. We also know very little about the contribution of general aviation to the noise problem at our major air carrier airports. We are undertaking studies at the present time to predict the noise exposure from these aircraft both now and in the future, but the universe of aircraft and airports are so large that it will be sometime before we have a fully comprehensive national view of the scope of the problem. Surely, general aviation noise is a problem at some airports, but we at EPA have no pre-conceived ideas about the severity of general aviation noise and to what extent it may or may not be a national problem. We cannot look at just the aircraft or their operations; we must consider the airport community as well. If land use near the airport has evolved wisely, there may be little or no disturbance for the community. On the other hand, ambient noise levels in communities surrounding general aviation airports may be significantly lower than around our major commercial air carrier airports. Thus, general aviation noise may be more intrusive for people living around the airport because it occurs against such a low ambient noise level. Consequently, the fact that general aviation aircraft are quieter than commercial jets is no reason for complacency. Thus, the possible noise problem associated with general aviation is not just a technological matter. There are socio-economic and environmental implications which must be considered as well.

We are anxious to hear from those of you attending this conference concerning the extent which you believe, based on your own experiences, that general aviation is a problem today or will be one in the future. This will help guide future studies by the Federal Government in this area and give us all a sense of perspective on general aviation noise.

WHAT CAN BE DONE ABOUT GENERAL AVIATION NOISE

If general aviation noise is today or will be in the future a serious problem for this country, what can be done about it? It will come as no surprise to any of us that there is no single solution to a problem as complex as aviation noise. Our experience in the commercial aviation noise area has shown that any realistic solution to the problem must combine actions by a variety of parties, all taken in coordination with each other. Needless to say, orchestrating such a control program is very difficult, particularly when large investments have already been made on the basis of the status quo. That is why working on the general aviation noise problem before it becomes a national crisis is attractive. Prevention is usually much cheaper and much easier to bring about politically than retrofit and abatement. Instead of making investments obsolete as we must do in some cases in the commercial aviation area, a preventative program might be able to focus future investments with little additional costs involved.

When people talk about quieting any aviation problem, they usually think first about abating the source of the noise, which in this case are the general aviation aircraft themselves. Some steps have already been taken by the aircraft industry to produce quieter aircraft. For instance, it is no longer possible to talk about "quiet" propeller aircraft and "noisy" jets. Some of our new jet aircraft today are quieter than propeller aircraft, and hopefully, quieter operation is the trend of the future for both types of aircraft. NASA is conducting research with assistance from EPA and FAA to develop quieter propeller driven and jet powered general aviation aircraft. We are hopeful that some technological advances, if only small ones, will result. Of course, there is no automatic link up between technological improvements in the laboratory and the incorporation of such improvements in the aircraft of the future. One of the very difficult policy questions for any person in a Federal regulatory agency such as EPA or FAA is the extent to which the manufacturers can be expected to aggressively move ahead to incorporate new technology and to develop new technology of their own instead of waiting to be forced to do so through some type of government regulation.

Quieting the source of the noise has proven to be in and of itself insufficient to solve the commercial aircraft noise problem and may well prove to be so in the general aviation area as well. Ways in which the aircraft are flown and the way in which airports are developed and expanded can have a major influence over the amount of noise exposure in the neighborhoods surrounding general aviation airports. New takeoff procedures incorporated now in an FAA advisory circular will provide considerable relief to airport communities surrounding air carrier airports in the future if the circular is complied with by the air carriers. Similar improvements in takeoff or landing procedures might provide some relief from general aviation aircraft also.

And then there is land use control. This country has been notoriously unsuccessful in controlling the land use around airports in the past. Even an airport as modern and advanced as Dallas/Ft. Worth is now beginning to suffer from encroachment by residential neighborhoods. Communities that once vowed that they would hold fast to decisions to ban incompatible land uses are now caving in to the economic pressures to allow residential development in areas impacted by the airport noise. Thus, we can expect that even our airports which are built out in the countryside will soon be subject to lawsuits by citizens who are outraged by the increasing noise coming from these major facilities. We need to seek stronger and more effective methods for controlling land use around commercial airports. The question for us at this Conference this week is whether such advances can be pioneered and perfected perhaps in the general aviation area where economic pressures today are not quite as great as they are around commerical airports but where the need in the future may be just as great.

We have in the audience for this Conference people who can give us a good perspective on the potential for these various means of dealing with general aviation. We have here representatives from Federal, State and local governments, from the aviation industry, airport operators, aircraft operators, aircraft manufacturers, representatives of environmentally concerned groups, neighborhood representatives, leaders of the real estate and lending institutions of our country, and spokesmen of the air carrier airports and military airports. Many of these groups have already had unique experiences in dealing with general aviation airport noise. Some have been involved in the adoption of regulations concerning general aviation airport usage. Some have seen these regulations struck down or are now involved in litigation concerning aviation regulations. All of us would like to share in each other's experiences. From this exchange, I hope there will be a mutual benefit. Speaking for EPA, we hope to gain added insight into ways in which all of us can work together in the years to come to deal with this problem.

So, I urge all of you to make your views heard. Is there a general aviation problem today or will there be one in the future and if so, what is its extent. Are there ways of controlling this noise in the future and how effective would each of these methods be? What actions need to be taken by some or all of us to bring about these solutions? In order to make this Conference a working Conference and not just a set of lectures, we restricted the total number of participants. In many cases, you may be the only person at the Conference with a particular perspective. So please take an active role in these discussions. Express your views so that they may affect the conclusion of the Conference and thereby the policies and actions of all of us in the future. We in EPA look forward to working with all of you during the next three days.

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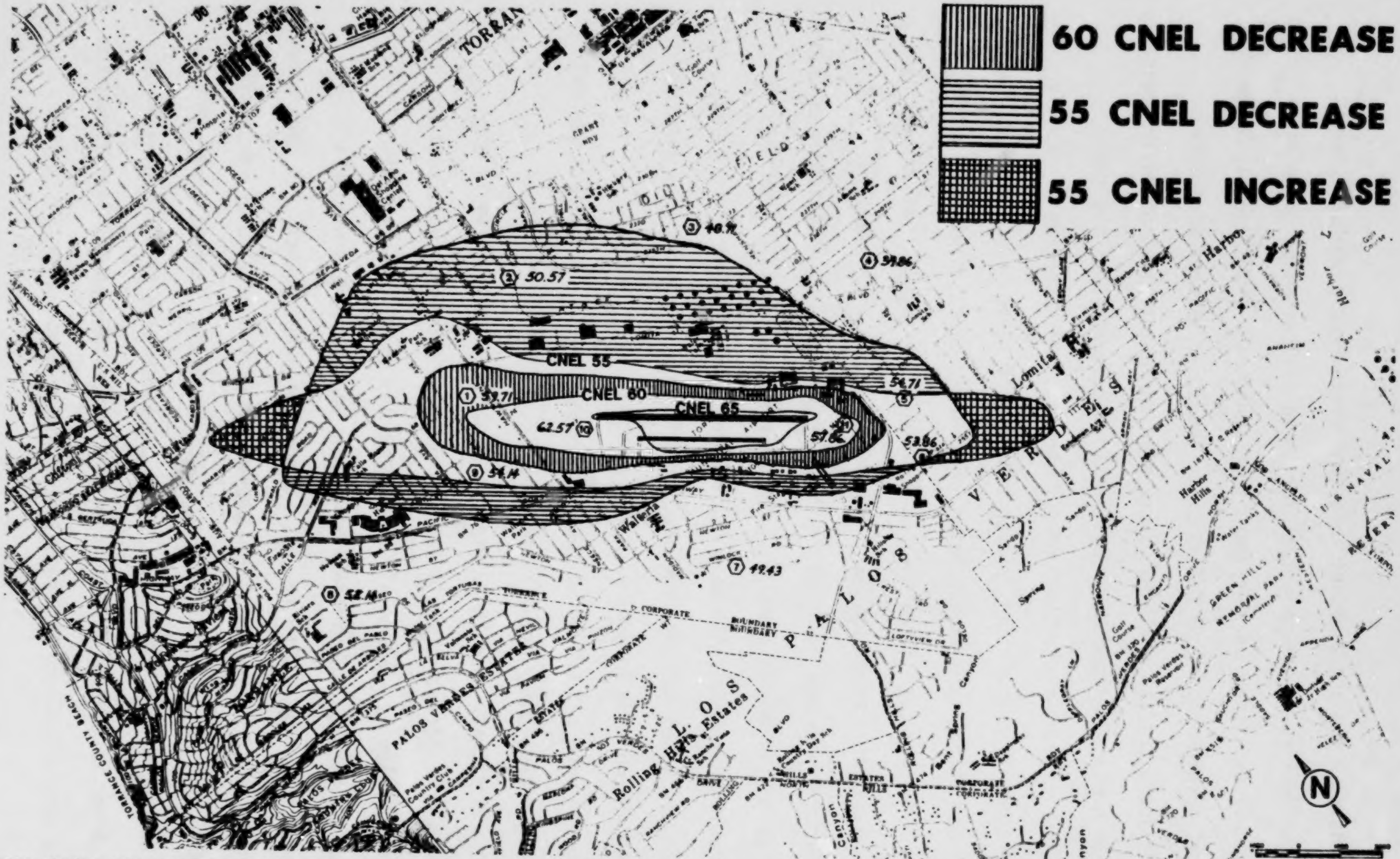
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PALOS VERDES
Rolling Hills Estates
Lomita
Harbor Hills
GREEN HILLS MEMORIAL PARK
TORRANCE COUNTY BEACH
CORPORATE BOUNDARY
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DATA BASED ON BB&N PROJECT 164358 (UPDATE) 1977 AND R. DIXON SPEAS ASSOCIATES ANCLUC STUDY FIRST QUARTERLY REPORT

NOISE ABATEMENT CENTER	TORRANCE MUNICIPAL AIRPORT AIRPORT NOISE CONTROL AND LAND USE COMPATIBILITY (ANCLUC) STUDY	CNEL CONTOURS 1979 vs 1977	DRAWING TOA-

AIRPORT NOISE CONTROL MATRIX

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Prepared for the

CONFERENCE ON GENERAL AVIATION

AIRPORT NOISE AND LAND USE PLANNING

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INTRODUCTION

The need for planning around airports has been recognized as a growing environmental impact problem. To date, the primary emphasis for most planning has involved air carrier airports with general aviation largely overlooked.

A survey of general aviation airports prepared under the National Environmental Policy Act requirements indicates that off-airport land use planning is decidedly limited. In a study conducted by Bragdon for EPA, 111 completed airport master plans were reviewed. Only 50% of these plans did address off-airport land use, and in nearly all instances the concern for land use compatibility was ignored.

The rational management of land adjacent to airports is essential to maximize our resources, and minimize conflict. Frequently, the incompatible development of this land results in litigation, residential displacement, and a loss in property tax revenue. A primary reason for the present condition is that constituents that participate and/or influence land use decision-making are not collectively involved. Typically there is little coordination between the public, private and quasi-public actors associated with airport-community related planning issues. For example, local governmental officials, land developers and financial institutions very often make independent decisions without concern for the long-range impacts. Without collective participation general aviation airport master plans will not be adequately developed and implemented. All role players and constituents must be identified and participate in general aviation airport planning to maximize effectiveness.

This report proposes a technique to assist local officials in identifying and gauging the involvement of the role players who participate, either directly or indirectly, in the development of an airport and its adjacent land area. The technique can serve as a guide for local decision-makers and officials in the preparation of a noise control strategy for their general aviation airport.

Two matrices are used to illustrate the involvement of the various parties in specific noise control measures. A noise control measure is an action taken by either the public or private sector that serves to prevent, curtail or reduce the negative impact of general aviation noise on the communities surrounding an airport.

The matrices distinguish party involvement during the two primary stages of the decision-making process: planning and implementation. The first matrix represents the level and manner of each party's involvement during the planning stage of the noise control measure(s). The second matrix represents the level and manner of each party's involvement during the implementation stage. It is the combination of these two matrices that reflect land use related decision making.

This report contains four sections. The first section lists and defines the various noise control measures that may be available to local officials in dealing with general aviation noise problems. Section two identifies the parties involved in the planning and implementation of the noise control measures. The extent of each party's involvement is discussed in section three, while the final section contains general conclusions. A complete matrix, which shows the interactive process of decision making, is contained in the Appendix.

NOISE CONTROL MEASURES

The noise control measures listed across the top of each matrix are divided into two categories: remedial and preventive. Those measures oriented more towards existing development around an airport are considered remedial; while the measures dealing with undeveloped land are preventive. Remedial measures are typically more expensive to carry out than preventive measures, since an existing capital intensive facility is in place.

The two categories are by no means mutually exclusive, however. For example, fee simple interest in property can be acquired for developed as well as undeveloped land. The cost of using such a measure as a remedial device, however, may be prohibitive.

Remedial Measures

The measures that can be used to correct the problems created by incompatible development around a general aviation airport include among others:

(1) Tax incentive
(2) Aircraft noise reduction
(3) Airport operator controls
(4) Fair disclosure ordinance
(5) Restrictions on private mortgage loans
(6) Housing relocation and assistance
(7) Purchase leaseback
(8) Aviation easement

Tax incentives can be offered by local governments to reduce the impact of aircraft noise on the communities adjacent to an airport. These incentives may take the form of a property tax rebate to homeowners and businesses that install sound attenuation insulation. The adoption of this measure may require special legislation by the state body legally enabling the local government to take such action.

Aircraft noise reduction requires the development of new engine designs or major redesign of existing engines. This is a long-term solution to the noise problem and will require increased research by the federal government and engine manufacturers.

Certain measures can be taken in the operation of an airport to minimize its impact on the surrounding area. For example, the airport operator can require that during certain times of the day, provided weather conditions are permitting, all aircraft use a designated runway. The approach path for the preferred runway may allow operations over the more sparsely developed area around the airport, thus minimizing the impact of noise. An operator may also require that pilots use a steeper approach to the runway.

Noise response monitoring is a type of airport operator control. A special noise monitoring staff is designated by the airport operator to receive and plot complaints of excessive aircraft noise. If a disproportionate share of complaints are located within a particular corridor, the approach and departure paths are realigned away from these areas. Often the monitoring includes acquisition of physical or acoustical airport data.

A fair disclosure ordinance requires realtors and developers to notify potential real estate purchasers that the subject property is adversely affected by aircraft noise. Such an ordinance requires local legislative action.

If money is not made available for the purchase of homes in areas adversely impacted by noise, residential development will be severely curtailed. Restrictions on private mortgage loans would accomplish this objective. Special state legislation would more than likely be required to carry out this measure.

An area immediately adjacent to the end of a runway may be so severely impacted by noise to the point where it is uninhabitable. In this case the airport operator will have to purchase the property and relocate the occupants. Federal assistance is available to accomplish this task through the federal Uniform Relocation Assistance Act of 1970.

In the event it becomes necessary for an airport operator to purchase a business severely impacted by noise or acquire a vacant tract of land immediately adjacent to the airport, they may wish to lease the property to a compatible tenant. Such a measure does generally require a large initial capital outlay.

A more inexpensive alternative to the purchase of property is the acquisition of an avigation easement. An avigation easement allows the proprietor to operate aircraft over a particular land area under a long term agreement. The effected owner(s) receive compensation, which represents a certain percentage of the fair market value of the property.

Preventive Measures

Measures that can be used to reduce or eliminate the potential for incompatible development around airports include:

(1) Zoning ordinance
(2) Subdivision regulations
(3) Building code
(4) Airport noise attenuation zone
(5) Capital improvements program
(6) Fee simple purchase
(7) Revolving fund purchase
(8) Installment-purchase
(9) Option
(10) Acquisition of the development rights

A zoning ordinance is used to regulate land use within a given jurisdiction. The ordinance specifies the uses that are permitted within designated areas or zoning districts. These zones are delineated by the local legislative body (i.e. City or County Council) or an appointed board (i.e. Planning Board) with input from the community. The ordinance itself is adopted by the local governing body and is enforced by either the local building inspector or a special zoning administrator.

The zoning ordinance can be used to control development around airports. Areas adjacent to an airport can be zoned to permit only those uses that will not be adversely affected by aircraft noise. Beside regulating the use of land, a zoning ordinance can legally regulate the height, bulk and area of a permitted use.

Subdivision regulations insure that lot layout and design and adequate improvements are provided for new development. These regulations can require that vacant land, adversely affected by aircraft noise, be subdivided into large lots, thus discouraging dense residential development. The actual siting of structures on the land can also be included in a regulation. Local governing body adopts subdivision regulations with input and advice from the community and the local planning board.

A building code prescribes the minimum standards for the construction of structures. This code, legally adopted by the local governing body, is meant to guarantee the health and safety and welfare of the community. The building code can require that all residential structures constructed within the areas impacted by aircraft noise be insulated with sound attenuation material. Often a certain sound transmission class (STC) is specified.

An airport noise attenuation zone combines characteristics of both the zoning ordinance and building code. This measure provides for the delineation of zones around an airport based on the relative impact of noise on these areas. Minimum sound attenuation standards are then established for the construction of new buildings within each zone.

A capital improvements program (CIP) is a planning tool used by local jurisdictions to phase the installation of needed public facilities (e.g. water and sewer lines, roads, schools) on a priority basis. A short-range CIP, which usually projects needs 3-5 years into the future, specifies what public improvements will be provided by a given jurisdiction and when these improvements will be constructed. A CIP precedes the preparation of a capital improvements budget (CIB). The CIB identifies the methods by which the improvements will be financed and the source of the funds. Development follows the installation of public improvements, such as utilities and roads. The CIP can serve to direct the expenditure of public funds in those geographical areas most compatible with airport related development.

A fee simple purchase of property entails the acquisition of all the rights associated with the ownership of that property. Among those rights are mineral, air, and development (as constrained by local land use regulations). An airport operator may wish to acquire fee simple interest in that property around an airport most severely impacted by aircraft noise. This measure would guarantee maximum control over the development of the property and insure against incompatible development. If the airport is still in the planning stages, this excess property can be acquired with the site itself. Once the property has been acquired the airport operator can opt to dispose of it for private development with attached restrictive covenants, retain ownership and maintain a buffer around the facility or retain the property for public use (i.e. parks, maintenance garage and storage areas).

The major drawback to the acquisition of fee simple interest in property is the initial capital outlay that is required. One of three alternatives measures can be used to acquire the needed property and reduce the initial capital outlay:

(1) Revolving fund purchase
(2) Installment-purchase
(3) Option

A revolving fund involves the acquisition of the needed property one tract at a time, the preparation of each tract for development, and the sale of the tract with attached conditions. The proceeds from the sale are then used to purchase the next tract and the cycle continues until all the land impacted by noise has been acquired and developed in a compatible manner.

An installation-purchase program allows the airport operator to acquire the property required over time. A bank may provide the initial outlay to the land owner in the form of a loan to the airport operator, who in turn repays the bank in annual installments.

An option conveys to its bearer the right to purchase a particular piece of property within a specified period of time. An airport operator may not have the necessary funds to acquire all the property impacted by noise so he/she would obtain an option on the property that cannot be purchased immediately. The term of an option varies with each agreement. If a three year option is obtained, the bearer must either purchase the property before the end of the term, renew the option, or relinquish his/her right to purchase the property. The cost of an option, although it varies, usually includes the property taxes and a standard interest charge.

Rather than purchase the entire fee simple interest in the property adversely affected by noise, an airport operator may wish to simply acquire the development rights for the property. This technique is appropriate when the land is being used for farming purposes. The cost of the development rights for a particular land parcel equals the difference between the value of that acre at its highest and best use and its existing value. If the highest and best use was dense multi-family or commercial development, the cost of the development rights would probably not be much less than the cost of the fee simple interest in the property. This measure is most effective where the highest and best use is low density residential, or if the development rights can be sold on the open market and transferred to another tract of land.

PARTIES INVOLVED IN NOISE CONTROL MEASURES

Parties from both the public and private sector are involved in planning and implementing noise control measures. In addition to public and private actors, the national organizations representing actors from both sectors are also listed on the matrices.

A description of each party's involvement in noise control is provided in this section. The descriptions are very general and merely provide a basic understanding of the kind of role each party assumes. The reader is referred to the matrices for a more comprehensive understanding.

Public Sector

Parties from all levels of the public sector are involved, either directly or indirectly, in a noise control strategy. Federal as well as local governments influence the development of general aviation airports and surrounding areas.

The public sector parties involved in the measures listed on the matrices include:

(1) Local governing body
(2) Local planning commission (including staff)
(3) Local governmental agencies
(4) Airport operator
(5) Quasi-public authorities
(6) Sub-state regional authorities
(7) State legislative body

(8) State administrative agencies
(9) Federal Aviation Administration
(10) Environmental Protection Agency
(11) Housing and Urban Development

The first five parties are most directly involved in noise control measures. The local governing body formulates policies and adopts regulations (e.g. zoning ordinance and subdivision regulations) which address the development of land adjacent to an airport. If the airport is operated by a governmental agency, the governing body is ultimately responsible for the operation of the facility.

The planning commission generally serves in an advisory capacity to the local governing body. The commission reviews zoning requests and subdivision plats and makes recommendations to the governing body. The staff to the commission plays a technical role, maintaining projections of the future needs of the community and preparing objective evaluations of land development related issues for the commission's consideration.

Local governmental agencies maintain existing community facilities and services and advise the governing body on the future location of public facilities. A capital improvements program, mentioned previously, coordinates the activities of these agencies.

The role of the airport operator will vary with the nature of the entity responsible for the operation of the facility. If the airport is operated by a governmental agency or a representative of the local government, all policies dealing with noise control will generally emanate from the local governing body. However, in the event an authority is created to oversee the construction, maintenance and operation of the airport, a board of directors (appointed by the local governing body) will formulate noise control policy.

A quasi-public authority can also influence development around an airport. The independent nature of authorities permits them to function outside the political process, once established. This independence creates a coordination problem. Each authority, whether it administers a water or a school system, can influence the direction and intensity of growth. Their activities must, therefore, be coordinated with those of the local governmental agencies if a comprehensive approach to development is to succeed.

Sub-state regional agencies generally serve a review function. This power (as granted through the Federal A-95 review process) permits these agencies to review and comment on plans which have some regional impact and entail the expenditure of federal funds (e.g. airport planning and construction).

The state legislative body passes enabling legislation that grants specific powers to municipalities and authorities. If a municipality wished to offer special tax incentives to guarantee compatible development around an airport, for example, special state legislation would more than likely be required.

In some cases the state department of transportation (DOT) provides grants for airport planning and construction. In Georgia, for example, the state DOT provides for 10% of the cost of the following items:

(1) Master plan preparation
(2) Runway construction and lighting installation
(3) Various costs such as utility extension

The federal government plays a significant role in airport planning and development. The Federal Airport Trust Fund, administered by the Federal Aviation Administration (FAA), provides airport planning and construction grants on an 80-20 match basis. Among the uses to which these grants can be put is the purchase of land adversely impacted by noise. The FAA also formulates federal policy dealing with airport noise control.

The EPA, through the Administrator is responsible for coordinating all federal noise efforts. Although EPA does have legal authority to propose regulations for controlling and abating aircraft noise the FAA, after consultation with EPA and the Secretary of Transportation, is responsible for prescribing and amending aircraft standards and regulations.

The Federal Housing Administration (FHA) and Veterans Administration (VA) insure home mortgages. The FHA, for example, has a policy of not insuring mortgages on homes located in the zone around an airport most severely impacted by aircraft noise. Less impacted impacted areas can receive mortgage approval only when certain controls are instituted (e.g. acoustical treatment of structure). Both of these programs are associated with the U.S. Housing and Urban Development.

Private Sector

The private sector parties involved in planning and implementing the measures listed on the matrices include:

(1) Fixed base operator
(2) Property owners
(3) Neighborhood organizations
(4) Environmental groups
(5) Local chamber of commerce
(6) Real estate firms
(7) Private developers
(8) Private contractors and builders
(9) Private lending institutions
(10) Aircraft engine manufacturing firms
(11) Planning and environmental consultants

A fixed base operator leases an airport terminal from a municipal or county government and maintains and operates the facility. Under these circumstances, the ultimate responsibility for airport policy lies with the local governing body.

Individuals who own property around an airport can have opposing interests in airport operations. A residential property owner may oppose airport operations if aircraft noise decreases their property values and disturbs them personally. Another property owner may, however, possess a vacant tract of land that is large enough to be developed industrially (or in some other compatible manner). This owner would, therefore, welcome airport expansion.

Neighborhood organizations consist of property owners and renters. If enough members of a particular organization are adversely affected by aircraft noise, the organization may well take a stand against airport operations. An environmental group would represent the interests of those citizens adversely affected by noise.

The local chamber of commerce consists of local businessmen and is concerned with the economic growth of the community. An airport can stimulate or enhance the economy of an area. Therefore, the Chamber of Commerce would tend to espouse the economic virtues of airport operations.

The development of land around an airport involves the participation of developers, lending institutions, contractors and builders, and real estate firms. The developer "packages" the development and obtains financing from a lending institution. "Packaging" a development often entails preparing a market analysis and project feasibility study and in some cases, acquiring the necessary property. The contractors and builders, as well as the developer, may be involved in the actual construction of the project. A real estate firm then sells the project.

Aircraft engine manufacturing firms are concerned with producing engines that provide for the safe and efficient operation of aircraft. Recent federal legislation requires that engines manufactured meet certain noise standards. As a result, engine manufacturing firms have a vested interest in noise control strategies for airports.

Consultants play an advisory role in planning and implementing noise control measures. Planning and environmental consultants sometimes assist in the preparation of airport compatibility studies. These firms can also serve in an advocacy position, representing the interests of a local community.

National Associations

There are several national associations which represent the interests of the various role players involved in airport noise and land use compatibility planning (see Appendix A). Most of the associations simply provide a forum where their members can express opinions on particular issues. Some of the associations are sufficiently large and they can exert political pressure on and influence the decisions of local, state and federal legislative and policy making officials. All of the associations listed in the appendix have roles to play in planning and implementing certain noise control measures.

The associations are divided into ten categories:

(1) Associations for aircraft operators
(2) Associations for airport operators
(3) Manufacturing related associations
(4) Associations dealing with airport services
(5) Associations related to airport safety

(6) Other aviation-related associations
(7) Environmental associations
(8) Real estate and development associations
(9) Banking associations
(10) Other relevant national associations

The associations represented in each category, due to a common interest, assume similar roles in the planning and implementation of noise control measures. The first six categories deal directly with aviation concerns. Associations for aircraft operators represent the interests of aircraft pilots and owners. One of the largest and most influential aviation associations, the Aircraft Owners and Pilots Association (AOPA), falls within this category.

The associations in category two represent airport operators. The third category includes associations which represent firms that produce and/or distribute aviation products (i.e. aircraft, aircraft engines, electronic devices, etc.).

The members of the associations in the fourth category rely on airports for their livelihood. Any disruption in the operation of an airport may affect the financial status of the members in this category. The last two aviation categories deal with flight safety and the overall development of the aviation industry, respectively.

The next three categories contain associations that represent specific airport noise and land development interests of communities around airports that are adversely affected by noise. The real estate and banking associations represent the respective interests of these two parties and, in some cases, influence the land development and lending practices and policies of association members.

THE EXTENT OF PARTY INVOLVEMENT IN NOISE CONTROL MEASURES

Knowledge of the noise control measures and the parties involved in those measures is a necessary prerequisite to the preparation of an effective noise control strategy. An understanding of the extent of the parties involvement is equally important, however, as it allows the officials devising a strategy to assess its impact and incorporate the input of these parties affected into any final plan or proposal.

Two indicators are used in the matrices to assess the extent of a party's involvement in a particular noise control measure: (1) the level of involvement and, (2) the manner of involvement.

Level of Involvement

A party is involved in a noise control measure on one of two levels: direct or indirect. The characteristics of each level are represented in Table 1.

Scale is the crucial distinguishing factor between direct and indirect involvement. The remaining characteristics are byproducts of scale. Those parties that operate at the local level and have an ongoing role in the local decision-making process will be more directly involved in planning and implementing noise control measures. Private as well as public parties are involved at this level. On

TABLE I

THE LEVEL OF PARTY INVOLVEMENT

DISTINGUISHING CHARACTERISTICS	Direct	Indirect
Scale	Restricted to Local Involvement	Regional, State, or Federal Involvement
Continuity	Continuous Involvement in Local Decision-Making Process	Sporadic Involvement in Local Decision-Making Process
Duration	Long-Term Involvement in Measure	Short-Term Involvement in Measure
Complexity	Decisions are Less Complex, Involving Fewer Parties	Decisions are More Complex, Involving Several Bureaucratic and Governmental Levels
Constituency	Party is Responsible to or in Constant Contact with Constituency Affected by Measure.	Party is Distant from Constituency Affected by Measure.

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the other hand, those governmental administrative agencies and private organizations removed from the local scene have only an indirect influence on the local decision-making process.

The higher the level of involvement the more time consuming and complex the decision-making process will be. For example, a zoning ordinance will only require decisions at the local level, whereas the purchase of fee simple interest in land will more than likely require federal and, in some cases, state funding. The inclusion of these two additional levels will involve more time and several more parties.

Manner of Involvement

Three parameters are used to distinguish the manner of a party's involvement in planning and implementing a noise control measure:

(1) The party serves in an advisory capacity
(2) The party has an economic stake in the measure, and
(3) The party is involved in an administrative, legislative or policy formulation manner.

The parties that approach the measure objectively, seeking to advise the decision-makers, function in an advisory capacity. Under certain circumstances, the role of the adviser will change from one stage of the process to the next. For example, while the planning commission and staff may serve in an advisory capacity during the planning stage of a zoning ordinance, once the ordinance is adopted, the role of the staff becomes administrative.

The input of a party with an economic stake in a measure will tend to be subjective. If, for example, a proposed airport zoning ordinance will restrict a property owner from developing his land beyond two units per acre when the market could bear a multi-family development, the property owner would have an economic stake in the matter and, therefore, assume a subjective position.

Governing bodies (including local and state bodies), administrative officials and boards, and airport operators comprise the group of parties involved in noise control measures in an administrative, legislative and policy formulation manner. Administrative and legislative tasks are, in most cases, carried out by local elected and appointed officials. Policy formulation is carried out by these officials, as well as state and federal agencies.

The manner of a party's involvement sometimes varies depending on when he is involved in the decision-making process. If, for example, a quasi-public authority has sold bonds for a public improvement on the assumption that dense development will follow, it will more than likely take a stand against land use controls requiring low density residential development or agricultural use. The authority's primary concern is with protecting the interests of its bondholders.

CONCLUDING REMARKS

The matrices discussed in this report provide some guidance to local officials in both the identification of the parties involved and, the assessment of the extent of the parties involvement, in carrying out selected noise control measures. These matrices serve only as references, however. The problems associated with coordinating the involvement of the parties is a complex process that will vary with each local situation. The measures chosen to deal with the problem will also vary, depending on such factors as: (1) the number of jurisdictions affected, (2) the availability of funds, and (3) the type of land uses affected.

It is essential that local officials perceive the scope of the general aviation noise problem and identify and involve all affected parties in the search for an appropriate noise control strategy. Such advance planning will result in the effective and rational management of land adjacent to general aviation airports, while minimizing the potential conflict between the many parties involved.

APPENDIX A

NATIONAL ASSOCIATIONS

I. Associations for Aircraft Operators

- (a) Aircraft Owners and Pilots Association
- (b) Lawyer-Pilot Bar Association
- (c) National Pilots Association

II. Associations for Airport Operators

- (a) Airport Operators Council International
- (b) American Association of Airport Executives

III. Manufacturing Related Associations

- (a) Aerospace Industries Association of America
- (b) Aircraft Electronics Association
- (c) Aviation Distributors and Manufacturers Association
- (d) General Aviation Manufacturers Association

IV. Associations Dealing with Airport Services

- (a) Air Freight Forwarders Association of America
- (b) Air Mail Pioneers
- (c) Air Transport Association of America
- (d) American Society of Traffic and Transportation
- (e) Commuter Airline Association of America
- (f) National Air Carrier Association
- (g) National Association of Flight Instructors
- (h) National Business Aircraft Association
- (i) National Agricultural Aviation Association

V. Associations Related to Airport Safety

  (a) Flight Safety Foundation

  (b) Institute of Navigation

  (c) National Safety Council

VI. Other Airport Related Associations

  (a) Aviation Development Council

  (b) National Air Transportation Association

  (c) National Association of State Aviation Officials

  (d) American Institute of Aeronautics and Astronautics

  (e) Transportation Association of America

VII. Real Estate Associations

  (a) American Land Development Association

  (b) American Land Title Association

  (c) American Institute of Real Estate Appraisers

  (d) National Association of Real Estate Appraisers

  (e) Society of Real Estate Appraisers

  (f) Real Estate Aviation Chapter

  (g) National Association of Real Estate Brokers

  (h) National Apartment Association

  (i) National Association of Industrial and Office Parks

  (j) National Association of Realtors

  (k) National Property Management Association

  (l) Relocation Assistance Association of America

  (m) Society of Industrial Realtors

  (n) American Real Estate and Urban Economics Association

VIII. Banking Associations

(a) Independent Bankers Association of America

(b) Mortgage Bankers Association of America

(c) American Bankers Association

(d) National Bankers Association

(e) American Savings and Loan League

(f) American Society of Bank Directors

(g) Council of Mutual Savings Institutions

(h) United Mortgage Bankers of America

(i) United States League of Savings Association

IX. Environmental Associations

(a) Institute of Environmental Sciences

(b) Environmental Action Coalition

(c) Community Environmental Council

(d) National Environmental Health Association

(e) Environmental Law Institute

(f) National Organization to Insure a Sound-Controlled Environment

(g) Committee on Noise as a Public Health Hazard

(h) Association for the Reduction of Aircraft Noise

(i) Citizens Against Noise

(j) Citizens for a Quieter City

(k) Sierra Club

(l) National Association of Noise Control Officials

X. Other Relevant National Associations

(a) Chamber of Commerce of the United States

(b) National League of Cities

(c) International City Management Association

(d) National Association of County Administrators

(e) National Association of Counties

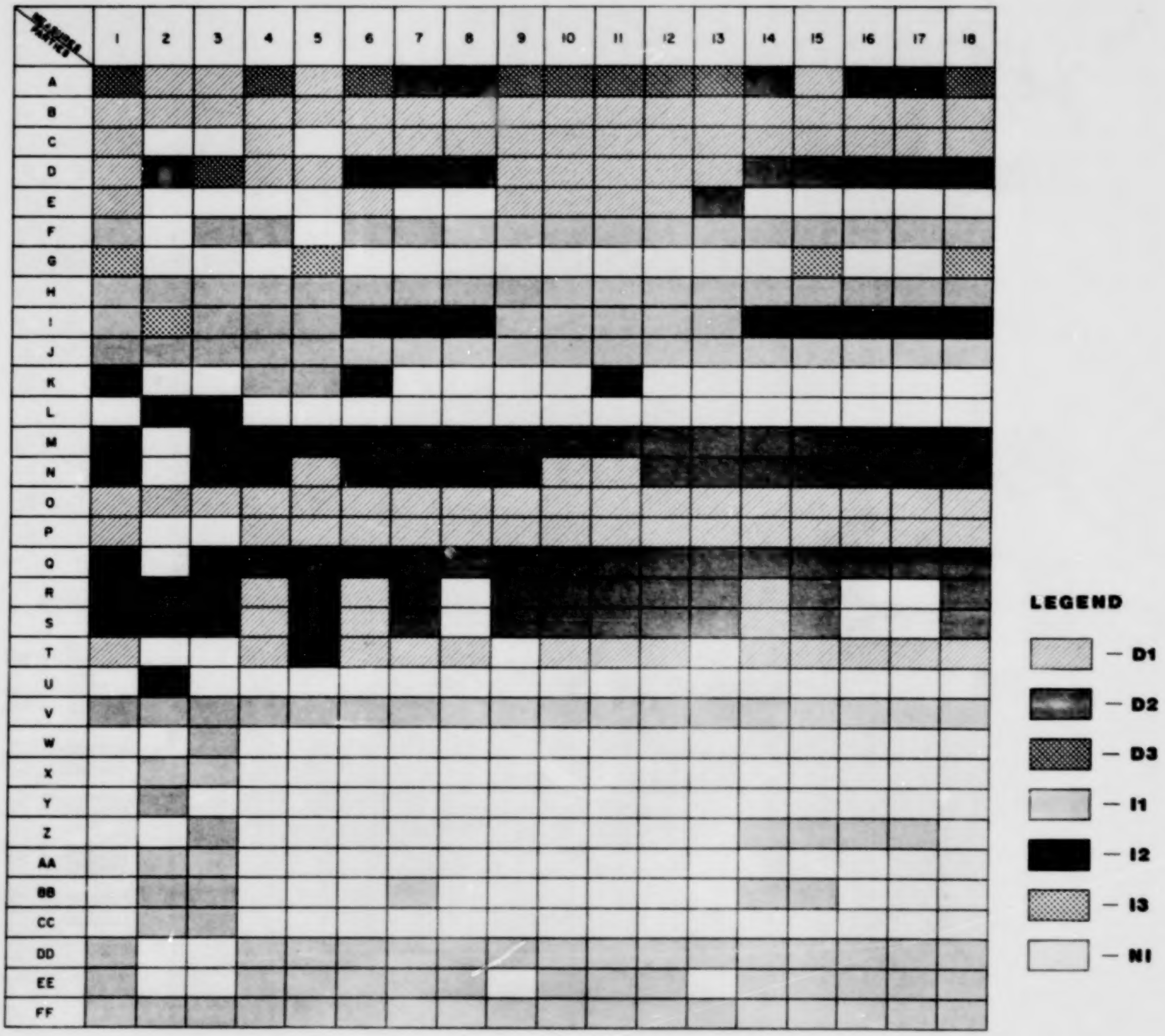
(f) Council of State Governments

(g) National Governors Association

(h) The Urban Land Institute

(i) Institute of Noise Control Engineering

NOISE CONTROL MATRIX:
PLANNING STAGE
(SCHEMATIC)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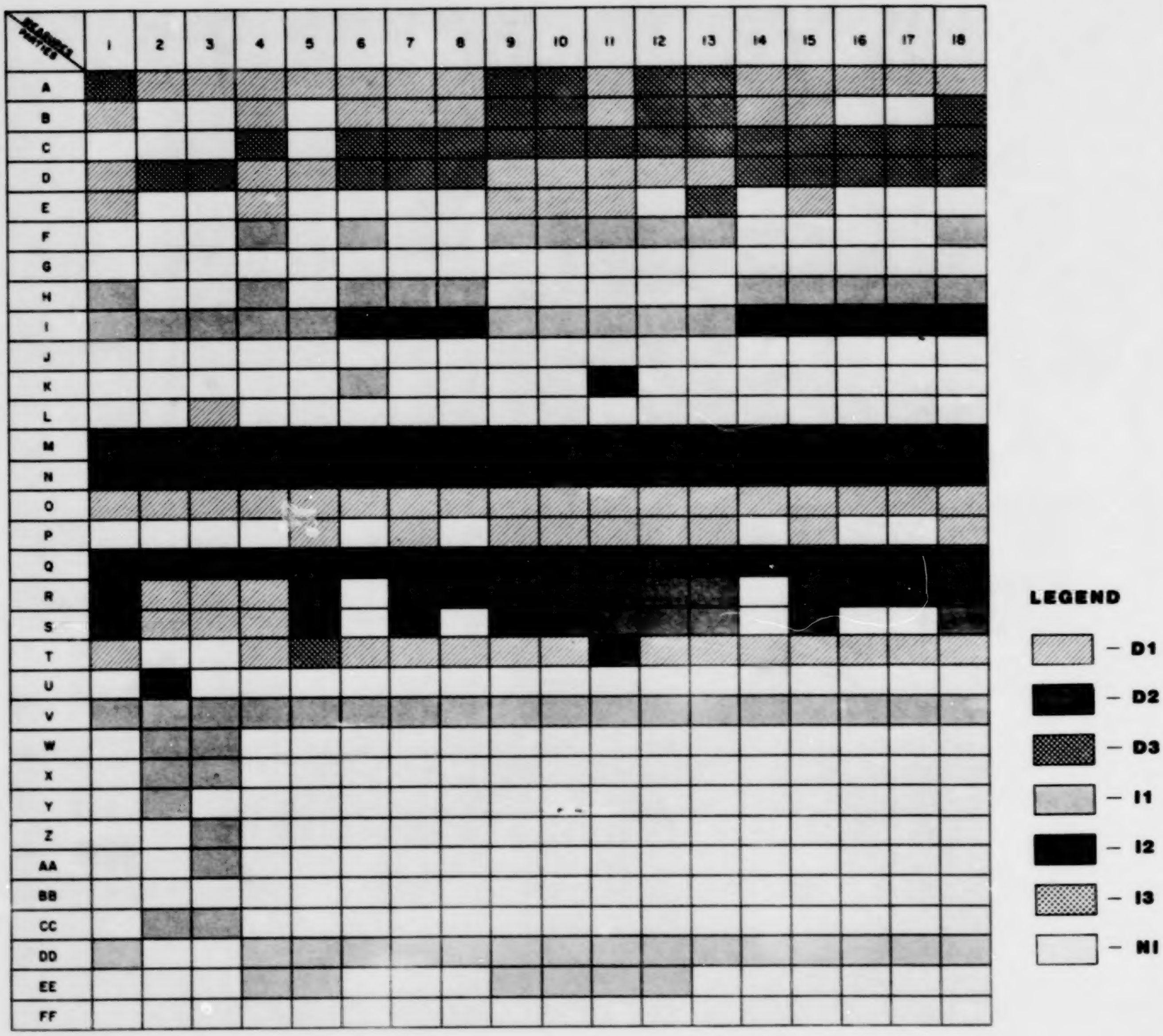
NOISE CONTROL MATRIX: IMPLEMENTATION STAGE (SCHEMATIC)



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KEY SHEET FOR PARTIES INVOLVED IN NOISE CONTROL MEASURES

A. Local Governing Body

B. Local Planning Commission (including staff)

C. Local Governmental Agencies

D. Airport Operator

E. Quasi-Public Authorities

F. Sub-State Regional Authorities

G. State Legislative Body

H. State Administrative Agencies

I. Federal Aviation Administration

J. Environmental Protection Agency

K. Housing and Urban Development

L. Fixed Base Operator

M. Property Owners

N. Neighborhood Organizations

O. Environmental Groups

P. Local Chamber of Commerce

Q. Real Estate Firms

R. Private Developers

S. Private Contractors and Builders

T. Private Lending Institutions

U. Aircraft Engine Manufacturing Firms

V. Planning and Environmental Consultants

W. Associations for Aircraft Operators

X. Associations for Aircraft Operators

Y. Manufacturing Related Associations

Z. Associations Dealing with Airport Services

AA. Associations Related to Airport Safety

BB. Other Aviation Related Associations

CC. Environmental Associations

DD. Real Estate and Development Associations

EE. Banking Associations

FF. Other Relevant National Associations

KEY SHEET FOR NOISE CONTROL MEASURES

1. Tax Incentive
2. Aircraft Noise Reduction
3. Airport Operator Controls
4. Fair Disclosure Ordinance
5. Restrictions on Private Mortgage Loans
6. Housing Relocation and Assistance
7. Purchase Leaseback
8. Aviation Easement
9. Zoning Ordinance
10. Subdivision Regulations
11. Building Code
12. Airport Noise Attenuation Zone
13. Capital Improvements Program
14. Fee Simple Purchase
15. Revolving Fund Purchase
16. Installment - Purchase
17. Option
18. Acquisition of Development Rights

LEVEL OF PARTY INVOLVEMENT IN NOISE CONTROL MEASURES
(Key to Legend)

D1 - Directly involved; party serves in an advisory capacity.

D2 - Directly involved; party has an economic stake in the measure.

D3 - Directly involved; party is involved in an administrative, legislative or policy formulation manner.

I1 - Indirectly involved; party serves in an advisory capacity.

I2 - Indirectly involved; party has an economic stake in the measure.

I3 - Indirectly involved; party is involved in an administrative, legislative or policy formulation manner.

N1 - Party is not involved in the measure.

GENERAL AVIATION IN THE UNITED STATES:
PAST, PRESENT, AND FUTURE

JOHN E. WESLER
OFFICE OF ENVIRONMENT AND ENERGY
FEDERAL AVIATION ADMINISTRATION

ANY DISCUSSION OF GENERAL AVIATION MUST BEGIN WITH SOME DEFINITION OF THE TERM. "GENERAL AVIATION" IS NOT STRICTLY DEFINED IN THE FEDERAL AVIATION REGULATIONS, WHICH ARE PROMULGATED BY THE FEDERAL AVIATION ADMINISTRATION (FAA) IN ORDER TO REGULATE AIR COMMERCE, PROMOTE, ENCOURAGE, AND DEVELOP CIVIL AERONAUTICS, AND CONTROL THE NAVIGABLE AIRSPACE OF THE UNITED STATES.

AS NORMALLY ACCEPTED, "GENERAL AVIATION" REFERS TO ALL CIVIL AIRCRAFT OPERATED IN THE UNITED STATES EXCEPT THOSE OPERATED UNDER PARTS 121 AND 127 OF THE FEDERAL AVIATION REGULATIONS--THAT IS, ALL LARGE AIRCRAFT AND HELICOPTERS USED IN SCHEDULED AIR CARRIER OPERATION. THUS, "GENERAL AVIATION" INCLUDES SUCH USES AS AIR TRAVEL CLUBS WITH BOEING 707S AND CONVAIR 880S, AIR TAXI AND COMMERCIAL OPERATORS OF SMALL AIRCRAFT, AIR CARGO CARRIERS, AND BUSINESS CORPORATE AIRCRAFT, IN ADDITION TO THOSE NORMALLY THOUGHT OF AS RECREATIONAL AIRCRAFT. ALONGSIDE THE SMALL SINGLE-ENGINE PROPELLER-DRIVEN PIPER CUB RESIDES A BOEING 707, CLASSIFIED AS A "GENERAL AVIATION" AIRPLANE.

FOR OUR PURPOSES THIS MORNING, I BELIEVE WE ARE MORE INTERESTED IN THE TYPES OF AIRCRAFT WHICH OPERATE INTO AND OUT OF THE SMALLER AIRPORTS AROUND OUR COUNTRY. ALTHOUGH STRICTLY SPEAKING, MANY LARGER JET-POWERED AIRPLANES ARE INCLUDED IN THE GENERAL AVIATION CATEGORY, THEY ARE NOT OF INTEREST TO US HERE BECAUSE THEY OPERATE ALMOST ENTIRELY OUT OF MEDIUM AND LARGE HUB AIRPORTS. WE MEAN TO CONCENTRATE ON SMALLER AIRCRAFT.

SMALLER GENERAL AVIATION AIRCRAFT DOMINATE THE U.S. CIVIL AIR FLEET. THERE ARE APPROXIMATELY 193,000 GENERAL AVIATION AIRCRAFT IN USE TODAY, COMPARED WITH LESS THAN 2,400 AIR CARRIER AND AIR CARRIER TYPE AIRCRAFT. GENERAL AVIATION AIRCRAFT:

- ARE FLOWN BY 798,800 ACTIVE PILOTS
- WILL FLY 39 MILLION HOURS THIS YEAR
- MAKE SOME 54 MILLION RECORDED OPERATIONS AT AIRPORTS WITH FAA TOWERS
- MAKE APPROXIMATELY 17 MILLION INSTRUMENT OPERATIONS

GENERAL AVIATION GROWTH WILL CONTINUE AT A HIGH RATE. OVER THE NEXT 12 YEARS--IN 1991--WE FORECAST THAT THERE WILL BE:

- 304,000 GENERAL AVIATION AIRCRAFT--AN ANNUAL INCREASE OF 3.9 PERCENT

- 1,110,700 ACTIVE PILOTS--AN ANNUAL GROWTH RATE OF 2.8 PERCENT
- 64 MILLION HOURS FLOWN--AN ANNUAL INCREASE OF 4.2 PERCENT
- NEARLY 76 MILLION RECORDED OPERATIONS AT AIRPORTS WITH FAA TOWERS--AN ANNUAL GROWTH RATE OF 3.0 PERCENT
- OVER 31 MILLION INSTRUMENT OPERATIONS--AN ANNUAL GROWTH RATE OF 5.1 PERCENT
- FASTER-THAN-AVERAGE GROWTH IN CORPORATE BUSINESS FLYING
- SLOWED GROWTH IN RECREATIONAL FLYING DUE TO CONTINUALLY RISING FUEL COSTS

THESE STATISTICS DISPLAY ONLY A PORTION OF THE GENERAL AVIATION ACTIVITY IN THIS COUNTRY. THE OPERATIONS LISTED ABOVE ARE ONLY THOSE AFFECTING THE FAA'S WORKLOAD--THAT IS, OPERATIONS AT AIRPORTS WITH FAA TOWERS. AT THE BEGINNING OF THIS YEAR, THERE WERE 14,574 AIRPORTS IN THE U.S., OF WHICH 13,853 HANDLED ONLY GENERAL AVIATION AIRCRAFT, AND 730 HANDLED BOTH GENERAL AVIATION AND CERTIFIED AIR CARRIER OPERATIONS. ONLY 428 OF THESE AIRPORTS HAVE FAA TOWERS. THUS, THE TOTAL NUMBER OF GENERAL AVIATION TAKEOFFS AND LANDINGS IN THIS COUNTRY IS OPEN TO QUESTION.

THE FORECASTED GROWTH IN GENERAL AVIATION ACTIVITY PORTENDS GROWING PROBLEMS AT THE SMALLER AIRPORTS WHICH MUST HANDLE THESE OPERATIONS. THE SHEER INCREASE IN THE NUMBER OF TAKEOFFS AND LANDINGS WILL INCREASE THE NUMBER OF NOISE EVENTS. ADDING TO THE ABSOLUTE GROWTH AT THE SMALLER AIRPORTS WILL BE THE LESSENED USE OF LARGER HUB AIRPORTS BY GENERAL AVIATION AIRCRAFT. THE POTENTIAL DANGERS OF MIXING OPERATIONS AT LARGER AIRPORTS WAS TRAGICALLY ILLUSTRATED LAST YEAR AT SAN DIEGO, WITH THE MID-AIR COLLISION BETWEEN AN AIR CARRIER 727 AND A SMALL SINGLE-ENGINE PROPRELLER-DRIVEN AIRPLANE. AS PART OF OUR PROGRAM TO REDUCE THIS RISK, THE FAA HAS ACCELERATED ITS IMPROVEMENTS OF SATELLITE, OR RELIEVER AIRPORTS NEAR MAJOR HUBS. AS THE NAME INDICATES, SATELLITE AIRPORTS WILL HAVE SUITABLE RUNWAYS, APRONS, CLEAR ZONES, AND NAVIGATIONAL EQUIPMENT TO ATTRACT GENERAL AVIATION AND TRAINING OPERATIONS AWAY FROM THE LARGER AIRPORTS. THUS, MANY SMALLER AIRPORTS WILL SEE SIGNIFICANT INCREASES IN OPERATIONS DURING THE COMING YEARS.

THE FEDERAL POLICY REGARDING AVIATION NOISE ABATEMENT WAS STATED IN 1976. ESSENTIALLY, IT WAS OUR THEME AT THAT TIME--AND REMAINS THE SAME TODAY--THAT AVIATION NOISE ABATEMENT IS

A SHARED RESPONSIBILITY AMONG ALL ELEMENTS OF THE AIRPORT COMMUNITY. THE FEDERAL GOVERNMENT MUST:

- CONTROL AIRCRAFT NOISE AT THE SOURCE--THE AIRPLANE ITSELF
- CONTROL AIRCRAFT OPERATIONS AND MANAGE THE NAVIGABLE AIRSPACE SO AS TO MINIMIZE NOISE IMPACTS
- PROVIDE FUNDING TO PERMIT AIRPORT NOISE ABATEMENT PROJECTS
- SUPPORT AND ENCOURAGE RESEARCH AND DEVELOPMENT OF NOISE ABATEMENT TECHNOLOGY

THE FAA HAS MET ITS RESPONSIBILITIES:

- NOISE STANDARDS LIMIT THE NOISE LEVELS OF NEW-DESIGN AND NEW-PRODUCTION AIRCRAFT, INCLUDING SMALL PROPELLER-DRIVEN MODELS
- OPERATIONS AT FAA-CONTROLLED AIRPORTS ARE TAILORED TO MINIMIZE NOISE IMPACTS
- FAA PROVIDES FEDERAL FINANCING OF AIRPORT PROJECTS FOR NOISE ABATEMENT PURPOSES, AND WE HAVE PROPOSED NEW LEGISLATION TO EXTEND ELIGIBILITY TO SOUNDPROOFING OF PUBLIC BUILDINGS NEAR AIRPORTS, AND NOISE MONITORING EQUIPMENT
- FAA WORKS CLOSELY WITH THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION TO PUSH NOISE ABATEMENT TECHNOLOGY

BUT THE FEDERAL EFFORTS ALONE CAN NEVER SOLVE THE AVIATION NOISE PROBLEM. AIRCRAFT WILL NEVER BE SILENT, NO MATTER HOW ADVANCED THE TECHNOLOGY. THERE WILL REMAIN A RESIDUAL NOISE IMPACT, WHICH MUST BE ATTACKED BY THE OTHER ACTORS IN THE AIRPORT GAME:

- AIRPORT OPERATORS ARE RESPONSIBLE FOR THE DAY-TO-DAY OPERATIONS AT THEIR AIRPORTS, AND ARE FINANCIALLY LIABLE FOR ANY DAMAGES WHICH RESULT, INCLUDING NOISE DAMAGES
- STATE AND LOCAL GOVERNMENTS ARE RESPONSIBLE FOR LAND-USE CONTROL AND ZONING, AND FOR PUBLIC EDUCATION AND AWARENESS OF THE AIRPORT NOISE CONDITIONS
- AIRCRAFT OPERATORS ARE RESPONSIBLE FOR THE PROPER CONTROL OF THEIR AIRPLANES, FLYING THEM SAFELY IN A MANNER LEAST INTRUSIVE TO AIRPORT NEIGHBORS

ALTHOUGH THE SUBJECT OF OUR MEETING HERE TODAY IS GENERAL AVIATION AIRPORT NOISE AND LAND-USE PLANNING, I WOULD LIKE TO CONCENTRATE FIRST ON THOSE THINGS WHICH AN AIRPORT PROPRIETOR CAN DO TO LIMIT NOISE AT HIS OR HER AIRPORT AND THUS MINIMIZE THE RESIDUAL JOB LEFT TO THE LAND-USE PLANNERS. RESTRICTING LAND USES FOR NOISE COMPATIBILITY

PURPOSES IS AN AGONIZING TASK. IN MANY CASES, IT IS AN IMPOSSIBLE TASK IF AIRPORT SURROUNDINGS ARE ALREADY DEVELOPED IN AN INCOMPATIBLE MANNER. TYPICALLY, LAND-USE PLANNING IS ONLY FEASIBLE AS A MEANS OF PROTECTING FURTHER NOISE IMPACTS, RATHER THAN CORRECTING THOSE WHICH ALREADY ARE PRESENT. THE LESS LAND AREA AFFECTED, THE BETTER--IN EITHER CASE.

AN AIRPORT OPERATOR IS IN AN UNCOMFORTABLE POSITION--LEGALLY RESPONSIBLE FOR NOISE DAMAGES RESULTING FROM THE OPERATION OF THAT AIRPORT, BUT OFTEN APPARENTLY WITH LITTLE CONTROL OVER THOSE OPERATIONS. THE FEDERAL GOVERNMENT HAS PRE-EMPTED CONTROL OVER THE NOISE GENERATOR--THE AIRPLANE--BOTH ITS INHERENT NOISE PRODUCTION AND THE MANNER IN WHICH IT IS FLOWN. SO WHAT'S LEFT?

ONE AVAILABLE MEANS IS THE CONTROL OR RESTRICTION OF THE TYPES OF AIRPLANES WHICH MAY USE AN AIRPORT, BASED ON THE NOISE CHARACTERISTICS OF THOSE AIRPLANES. CURFEWS ARE ONE READILY-APPARENT EXAMPLE, EITHER BY CLOSING THE AIRPORT COMPLETELY AT NIGHT, OR BY RESTRICTING AIRPORT USE TO "QUIET" AIRPLANES DURING CERTAIN HOURS. RESTRICTING USE OF AN AIRPORT THROUGH A BAN ON JET-POWERED AIRCRAFT, BECAUSE OF NOISE, IS NOT PERMISSABLE. SO-CALLED "JET BANS" HAVE BEEN RULED TO BE DISCRIMINATORY BY THE COURT IN THE

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RECENT SANTA MONICA CASE, SINCE IT WAS SHOWN THERE THAT SOME JET AIRCRAFT ARE ACTUALLY QUIETER IN OPERATION THAN SOME PROPELLER-DRIVEN AIRCRAFT.

IF THE REASON FOR USE-RESTRICTIONS AT AN AIRPORT IS NOISE, THEN NOISE LEVELS CAN BE EMPLOYED TO RESTRICT USE. THE FAA HAS PUBLISHED ADVISORY CIRCULAR 36-3, DATED MAY 29, 1979, LISTING IN DECENDING ORDER OF NOISE LEVEL MANY AIRCRFT TYPES AND MODELS. THESE NOISE LEVELS ARE BASED ON STANDARDIZED TESTS, FOLLOWING THE PROCEDURES DEFINED IN THE FAA'S NOISE STANDARDS, 14 CFR 36. LEVELS ARE TABULATED FOR ALL AIRCRAFT, FOR WHICH RELIABLE DATA ARE AVAILABLE, AT THREE LOCATIONS--THE TAKEOFF, SIDELINE, AND APPROACH LOCATIONS SPECIFIED IN THE NOISE REGULATIONS. THUS, RELIABLE, COMPARABLE, STANDARDIZED NOISE VALUES ARE READILY AVAILABLE FOR GENERAL USE. AN AIRPORT OPERATOR MAY THEN LIMIT THE USE OF AN AIRPORT TO AIRCRAFT WHICH GENERATE NO MORE THAN--FOR EXAMPLE--85 A-WEIGHTED DECIBELS AS MEASURED DURING TAKEOFF UNDER THE STANDARDIZED PROCEDURES OF 14 CFR 36, AND HAVE AVAILABLE A NONARBITRARY AND NONDISCRIMINATORY BASIS FOR DETERMINING WHICH TYPES OF AIRCRAFT ARE ADMISSABLE AND ACCEPTABLE AT THAT AIRPORT. THE ACTUAL NOISE LIMIT SELECTED MUST, OF COURSE, DEPEND ON THE DEGREE OF NOISE PROTECTION JUSTIFIED AT AN AIRPORT. AND, OF COURSE, AN AIRPORT OPERATOR WILL NEED TO EXAMINE CAREFULLY JUST WHAT SUCH A RESTRICTION WILL DO TO THOSE AIRCRAFT OPERATORS THAT HIS OR HER AIRPORT SERVES.

IT IS OFTEN TEMPTING TO INSTALL A MICROPHONE OFF THE RUNWAY OF AN AIRPORT, AND LIMIT THE USE OF AN AIRPORT BASED ON ACTUAL NOISE MONITORING. ASIDE FROM THE TECHNICAL COMPLICATIONS AND EXPENSE OF SUCH AN APPROACH, THE FAA OPPOSES SUCH RESTRICTIONS ON THE BASIS OF SAFETY. PILOTS--AND ESPECIALLY LESS EXPERIENCED PILOTS--MAY BE TEMPTED TO "BEAT THE BOX" IN SUCH INSTANCES, BY FLYING IN AN UNSAFE MANNER IN ORDER TO REDUCE NOISE OVER THE MONITORING POINT. IN ADDITION, CONSTANTLY CHANGING PROPAGATION AND METEOROLOGICAL CONDITIONS WILL CAUSE NOISE LEVELS AT A GIVEN POINT TO CHANGE FROM DAY-TO-DAY, EVEN THOUGH THE SAME AIRCRAFT IS FLOWN IN EXACTLY THE SAME MANNER. THUS, A PILOT IS NEVER CERTAIN THAT HE OR SHE WILL MEET A SET MEASURED LEVEL EACH TIME HE OR SHE FLIES, AND MAY BE TEMPTED TO ALTER THE FLIGHT PROCEDURE "JUST TO BE SURE". I BELIEVE THAT THE STANDARDIZED NOISE LEVELS TABULATED IN ADVISORY CIRCULAR 36-3 ARE A BETTER BASIS FOR RESTRICTING AIRCRAFT USE AT AN AIRPORT, THAN ARE MONITORED SINGLE-EVENT LEVELS.

IN SUMMARY:

- GENERAL AVIATION ACTIVITY IS GROWING, AND WILL CONTINUE TO GROW IN THE FORESEEABLE FUTURE
- ALTHOUGH THE INDIVIDUAL NOISE LEVELS OF NEW GENERAL AVIATION AIRCRAFT WILL BECOME QUIETER AS THE FAA'S NOISE STANDARDS BECOME INCREASINGLY EFFECTIVE, SHEER VOLUME OF ACTIVITY WILL CONTINUE NOISE PROBLEMS AT SOME GENERAL AVIATION AIRPORTS

- LAND-USE CONTROLS AND ZONING ARE DIFFICULT TO IMPOSE, AND REPRESENT ESSENTIALLY THE LAST RESORT IN AVIATION NOISE ABATEMENT
- THERE ARE CONSTITUTIONAL AND PRACTICAL MEANS FOR RESTRICTING AIRPORT USE FOR NOISE CONTROL PURPOSES

"A STATE PERSPECTIVE ON GENERAL AVIATION AND PLANNING"

AN ADDRESS PRESENTED AT THE EPA CONFERENCE
ON GENERAL AVIATION AIRPORT NOISE AND LAND USE COMPATIBILITY
OCTOBER 3-5, 1979

BY LUCIE G. SEARLE, COMMUNITY LIAISON
MASSACHUSETTS AERONAUTICS COMMISSION

I AM DELIGHTED TO BE A PARTICIPANT IN THIS EPA CONFERENCE ON GENERAL AVIATION AIRPORT NOISE AND LAND USE PLANNING. IT'S A SUBJECT THAT'S CLOSE TO OUR HEARTS AND EARS IN MASSACHUSETTS, SO I WELCOME THIS OPPORTUNITY TO SHARE WITH YOU SOME OF OUR THOUGHTS ON THE SUBJECT WHICH ARE, OF COURSE, FROM ONE STATE'S PERSPECTIVE.

RECENTLY, I STUMBLED ACROSS A MAGAZINE ARTICLE THAT I BELIEVE SUMS UP QUITE NICELY THE AVIATION NOISE PROBLEM FROM THE PERSEPCTIVE OF AN AIRPORT NEIGHBOR. IT IS ENTITLED "AIRPLANE, STAY 'WAY FROM MY ROOF." THE AUTHOR WRITES: "YOU MOVE OUT FROM THE NOISE OF A CITY, YOU PAY A PREMIUM TO BE AWAY FROM THE RAILROAD, YOU GO TO A LOT OF TROUBLE AND EXPENSE TO GET ON A SIDE STREET AWAY FROM BUSSES AND THE TRUCKS. SO WHAT DO YOU GET? WHY, ALONG WITH A BIG MORTGAGE, NEIGHBORS, A MANGY LAWN AND A LEAKING BASEMENT, YOU GET PLANES. IT TURNS OUT YOUR QUIET RESIDENTIAL SECTION IS A BOARDWALK FOR MODERN AVIATION, AND THE PLANES COME OVER AS IF YOU HAD PUT SUET OUT FOR THEM." THIS ARTICLE APPEARED IN A 1947 ISSUE OF THE SATURDAY EVENING POST. IT WAS CITED AT AN EARLIER AVIATION CONFERENCE SPONSORED BY THE NATIONAL AERONAUTIC ASSOCIATION IN 1947 AND USED IN A SPEECH ENTITLED "MAKING GOOD NEIGHBORS OF AIRPORTS."

TODAY IN MASSACHUSETTS, WE HAVE A GENERAL AVIATION NOISE PROBLEM THAT IMPACTS NOT ONLY AIRPORT NEIGHBORS LIKE THE AUTHOR OF THIS ARTICLE,

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BUT THREATENS THE VIABILITY OF SEVERAL OF OUR KEY SUBURBAN GA AIRPORTS. BECAUSE OF NOISE, WE ARE HAVING GREAT DIFFICULTY--IN FACT, WE ARE LOSING THE BATTLE AT ONE PARTICULAR AIRPORT--IN MAINTAINING THE RUNWAYS AND TAXIWAYS THAT WE ALREADY HAVE, NEVER MIND EXTENDING OR ADDING NEW RUNWAYS. AND IF YOU REALLY WANT TO HAVE A SHOWDOWN BETWEEN THE AIRPORT AND ITS NEIGHBORS, TRY TO PUT IN AN INSTRUMENT LANDING SYSTEM. ALTHOUGH SUCH A KEY NAVIGATIONAL AID, UNDOUBTEDLY, ENHANCES SAFETY FOR AIRPORT NEIGHBORS AND USERS, IT IS REGARDED--IRRATIONALLY, I BELIEVE-- BY MANY AS A PIECE OF EQUIPMENT THAT WILL LEAD TO AN INCREASE IN OPERATIONS AND, THEREFORE, MORE NOISE. WHAT MAKES TODAY'S SITUATION SO AGONIZING IS THAT JUST ABOUT ALL OF OUR GENERAL AVIATION AIRPORTS IN MASSACHUSETTS WERE SITED 30-40 YEARS AGO IN UNDEVELOPED AREAS SURROUNDED BY AMPLE OPEN SPACE.

THE SOLUTIONS TO OUR NOISE PROBLEM TODAY ARE THE SAME ONES THAT WERE AVAILABLE IN 1947: NOISE CONTROL AT THE SOURCE THROUGH QUIETER AIRCRAFT; OPERATING PROCEDURES; AND LAND USE CONTROLS. FROM THE STATE PERSPECTIVE, I'M GOING TO REVIEW EACH OF THESE THREE ELEMENTS AND COMMENT ON OUR EXPERIENCE AS WELL AS WHAT I BELIEVE NEEDS TO BE DONE. OUR "MASSACHUSETTS EXPERIENCE" INVOLVES A STATE SYSTEM OF 25 PUBLICLY OWNED AIRPORTS AND AS MANY PRIVATELY OWNED AIRPORTS OPEN TO THE PUBLIC.

1. SOURCE CONTROL IS PRIMARILY A FEDERAL AND INDUSTRY RESPONSIBILITY. FROM A STATE VIEWPOINT, WE BELIEVE A GREAT DEAL REMAINS TO BE DONE HERE, PARTICULARLY WITH PISTON ENGINED PROPELLER AIRPLANES. PROPS ARE BY FAR THE BIGGEST USERS OF OUR GENERAL AVIATION AIRPORTS. BESIDES THEIR HIGH VISIBILITY AND, I MIGHT ADD, AUDIBILITY, IN THE TOUCH AND GO OPERATIONS ASSOCIATED WITH FLIGHT TRAINING, PROPS CONSTITUTE THE LARGEST SEGMENT OF THE BUSINESS AVIATION FLEET, WHICH MAKES EXTENSIVE USE OF OUR GA AIRPORTS.

PROP NOISE CAN BE CONTROLLED BY REDUCING PROPELLER TIP SPEED WHICH CAN BE ACHIEVED BY A SLOWER TURNING PROP OR A MULTI-BLADED PROP. FROM WHAT I CAN LEARN, WE ALREADY HAVE A GOOD DEAL OF KNOW-HOW WHICH GOES BACK MANY YEARS. AND ADDITIONAL RESEARCH IS GOING ON RIGHT NOW TO LEARN HOW TO BUILD A LOW-NOISE PROP--SUITABLE FOR NEW DESIGN AIRPLANES OR RETROFIT--WITHOUT SACRIFICING PERFORMANCE. THIS EFFORT IS BEING CONDUCTED JOINTLY BY MIT AND NASA UNDER EPA SPONSORSHIP.

WHAT SEEMS TO BE MISSING IS THE INCENTIVE, PARTLY BECAUSE IT IS ONLY IN RECENT YEARS THAT GENERAL AVIATION AIRPORT NEIGHBORS HAVE FLEXED THEIR POLITICAL MUSCLES AND PARTLY BECAUSE FAA'S FAR 36 STANDARDS FOR LIGHT PROPS PRESENT LITTLE OR NO CHALLENGE TO THE INDUSTRY. SINCE FAR 36 WAS ESTABLISHED IN 1969, THE MODEST STANDARDS SET FOR LIGHT PROPS (UNDER 12,500 LBS.) HAVE NOT BEEN AMENDED TO REQUIRE MORE STRINGENT NOISE LEVELS. THE RESULT IS THAT THE VAST MAJORITY OF LIGHT PROPS HAVE, FOR SOME TIME, MET FAA'S LENIENT STANDARDS.

FROM THE INDUSTRY'S POINT OF VIEW, ONE OBSTACLE MAY BE THE ENORMOUS COST AND COMPLEXITY OF FAA CERTIFICATION OF EVEN THE SLIGHTEST DESIGN CHANGE, A SITUATION WHICH OBVIOUSLY DISCOURAGES INNOVATION AND RETROFIT. I ALSO WANT TO ACKNOWLEDGE THAT SOME OF THE NEWER MODEL PROPS--AND HERE I THINK OF THOSE MANUFACTURED BY CESSNA AND PIPER--HAVE ACHIEVED COMMENDABLE NOISE REDUCTION GAINS, PRIMARILY BY LOWERING THE RPMS.

AT ANY RATE, A COMPELLING CASE CAN BE MADE FOR IMPROVING THE PROP SITUATION, PARTICULARLY WHEN WE REMEMBER THAT THIS FLEET DOES NOT TURN OVER VERY QUICKLY. THERE IS A BACK DOOR APPROACH TO DEALING WITH THE FEDERAL REGULATORY INERTIA WHICH MY OWN COMMISSION HAS REFUSED TO SANCTION SO FAR, PARTLY BECAUSE OF THE CHAOS THAT WOULD RESULT

FROM AIRPORT TO AIRPORT AND STATE TO STATE AND ALSO BECAUSE IT WISHES TO AVOID REINFORCING WHAT SOME REGARD AS MASSACHUSETTS' ANTI-BUSINESS IMAGE. AND THAT IS THE SETTING OF MAXIMUM AIRCRAFT NOISE LEVELS BY THE AIRPORT PROPRIETOR. ONE OF OUR GA AIRPORTS PROPOSED TO SET A NOISE LEVEL REQUIREMENT WHICH WOULD HAVE BEEN MORE STRINGENT THAN FAR 36, BUT FOR SEVERAL REASONS, MY COMMISSION TURNED THE PROPOSAL DOWN. THE POINT I WANT TO MAKE HERE IS THIS: WE WOULD LIKE TO TIE OUR STATEWIDE SOURCE NOISE POLICY TO A NATIONAL NOISE STANDARD SUCH AS FAR 36; BUT IT BECOMES INCREASINGLY HARD TO DO THIS BECAUSE SOME OF THE FAR 36 STANDARDS ARE SO WEAK.

THE EFFORT TO QUIET THE BUSINESS JET FLEET IS ANOTHER STORY. HERE, I BELIEVE, WE HAVE BEEN MUCH MORE SUCCESSFUL. DESIGN STANDARDS, FIRST SET BY THE FAA IN 1969, WERE TIGHTENED IN 1977, AND A PRODUCTION CUTOFF DATE OF 1975 WAS SET FOR OLDER NOISY MODELS. THERE IS HARDLY AN AIRPORT NEIGHBOR THAT DOESN'T RECOGNIZE THE QUIETNESS OF THE CESSNA CITATION. THERE ARE OTHERS WITH IMPRESSIVE NOISE RECORDS, TOO, SUCH AS THE FALCON 10, THE WESTWIND, AND THE NEWER LEAR JETS, JUST TO NAME A FEW. IN FACT, WE HAVE DOCUMENTED THAT AT ONE OF OUR GA AIRPORTS, OVER 40% OF THE BUSINESS JET FLEET IS MADE UP OF CITATIONS AND SIMILAR TURBO FANS. WHILE I DO NOT HAVE COMPLETE FIGURES FOR OUR OTHER GA AIRPORTS, IT WOULD NOT SURPRISE ME TO LEARN THAT A LARGE PERCENTAGE OF THEIR BUSINESS JET FLEETS IS COMPOSED OF THE QUIETER MODELS. WHILE THE BUSINESS JET FLEET HAS A MUCH FASTER TURNOVER THAN THE PROP FLEET, THE FACT REMAINS THAT BOTH TECHNOLOGY AND THE MARKETPLACE HAVE RESPONDED TO FAA'S INCREASINGLY STRINGENT FAR 36 STANDARDS.

2. OPERATING PROCEDURES IS THE SECOND OF THE THREE PART SOLUTION. THIS INVOLVES DESIGNING SITE SPECIFIC MEASURES THAT ADDRESS AN AIRPORT'S PARTICULAR NOISE PROBLEMS. IN MASSACHUSETTS, THESE HAVE INCLUDED PRESCRIBED FLIGHT PATHS, PREFERENTIAL RUNWAYS, REQUIREMENTS THAT AIRPLANES BE AIRBORNE IN THE FIRST HALF OF THE RUNWAY, TIME OF DAY AND SEASONAL RESTRICTIONS FOR TOUCH AND GO OPERATIONS AND DESIGNATED AREAS FOR RUNUPS.

WE HAVE FOUND THAT THE MOST EFFECTIVE RESULTS COME AFTER A PARTICIPATORY EFFORT THAT INVOLVES AIRPORT NEIGHBORS AND USERS ALONG WITH THE RESPONSIBLE FEDERAL, STATE AND LOCAL OFFICIALS.

OPERATING PROCEDURES ARE NOT A PANACEA, BUT THEY CAN HELP TO MINIMIZE NOISE IMPACTS, PARTICULARLY IF SOME NON RESIDENTIAL AREAS STILL EXIST OVER WHICH AIRCRAFT CAN BE DIVERTED. ALSO, OPERATING PROCEDURES OFTEN OFFER THE ONLY TANGIBLE NOISE RELIEF TO AIRPORT NEIGHBORS.

WHEN I THINK ABOUT OPERATING PROCEDURES AT OUR GA AIRPORTS, I CANNOT HELP BUT SINGLE OUT THE NATIONAL BUSINESS AIRCRAFT ASSOCIATION WHICH HAS BEEN A LEADER IN DEVISING PROCEDURES AND SPREADING THE NOISE ABATEMENT MESSAGE AMONG ITS MEMBERS.

TO GET THE MOST OUT OF PROCEDURES, IT HAS BEEN OUR EXPERIENCE THAT WE NEED MORE HELP FROM THE FAA AIR TRAFFIC CONTROLLERS AT OUR TOWERED AIRPORTS. WHILE WE DO NOT EXPECT THEM TO ENFORCE LOCAL REGULATIONS, WE BELIEVE MORE COULD BE DONE TO INFORM AND REMIND PILOTS OF THE NOISE RULES IN EFFECT.

3. LAND USE, THE THIRD ELEMENT OF OUR NOISE ABATEMENT TRIO, IS A MOST CRITICAL AND CHALLENGING TASK. APPLYING LAND USE CONTROLS IS, UNDOUBTEDLY, A LOCAL AND STATE RESPONSIBILITY, ALTHOUGH THERE IS CERTAINLY A FEDERAL ROLE, PARTICULARLY IN THE FINANCIAL AREA.

HERE ARE SOME OBSERVATIONS AND HIGHLIGHTS BASED ON OUR EXPERIENCE.

IN OUR STATE, AND I SUSPECT THIS IS TRUE IN MANY OTHERS, LAND USE IS A JEALOUSLY GUARDED LOCAL FUNCTION, IN LARGE PART BECAUSE OF THE PROPERTY TAX IMPLICATIONS. OUR ONE EFFORT, IN 1976, TO ENACT STATE LEGISLATION THAT WOULD HAVE REQUIRED LOCAL GOVERNMENTS TO EXERCISE LAND USE CONTROLS NEAR AIRPORTS, WAS UNSUCCESSFUL. THE PROBLEM IS COMPOUNDED, OF COURSE, BY THE NEED FOR PROPER LAND USE PLANNING, NOT ONLY ON THE PART OF THE MUNICIPALITY IN WHICH THE AIRPORT IS LOCATED, BUT ALSO THE ABUTTING COMMUNITIES. OUR CLASSIC "WHAT NOT TO DO STORY" IS OF ONE OF OUR MORE ACTIVE SUBURBAN BOSTON GA AIRPORTS, BUILT IN THE 1940'S. BEVERLY AIRPORT IS LOCATED IN BEVERLY AND DANVERS AND ABUTS A THIRD COMMUNITY, WENHAM. FOR SOME TIME, THIS AIRPORT WAS PRETTY MUCH SURROUNDED BY UNDEVELOPED LAND; BUT IN THE EARLY 1960'S, A DEVELOPER PURCHASED SOME ADJACENT FARM LAND IN THE NEIGHBORING TOWN OF DANVERS AND BUILT SCORES OF HOMES, SOME OF WHICH ARE LESS THAN 400 FT. FROM THE LONGEST RUNWAY. TODAY, OF COURSE, IT IS A NO WIN SITUATION FOR ALL INVOLVED BECAUSE THE AIRPORT NEIGHBORS HAVE TO CONTEND WITH NOISE,AND THE PILOTS HAVE HAD NOISE ABATEMENT RESTRICTIONS IMPOSED ON THEM.

WHAT ARE WE DOING ON THE STATE LEVEL TO PREVENT THIS KIND OF INCOMPATIBLE DEVELOPMENT FROM RECURRING? BASICALLY, FOUR THINGS: (1) PROVIDING TECHNICAL ASSISTANCE; (2) PROMOTING AIRPORTS AS ECONOMIC AND TRANSPORTATION ASSETS; (3) JAWBONING AND MORAL SUASION; AND (4) INVOLVING NEW RECRUITS IN THE CAUSE.

ON THE FIRST: PROVIDING TECHNICAL ASSISTANCE MEANS

WORKING WITH AIRPORT MANAGEMENT AND LOCAL OFFICIALS TO COME UP WITH WAYS TO INSURE COMPATIBLE LAND USE. THIS MAY INVOLVE ZONING, PURCHASE OF LAND OR EASEMENTS, SUBDIVISION CONTROL, NOTICE TO PROSPECTIVE RESIDENTS THAT AN AIRPORT IS NEARBY, SPECIAL PERMITS AND OTHER STRATEGIES. BECAUSE THIS IS HOW I SPEND A GOOD DEAL OF MY TIME, I HAVE, DURING THE PAST YEAR, PUT TOGETHER A GUIDE TO COMPATIBLE LAND USE PLANNING NEAR AIRPORTS IN MASSACHUSETTS. THIS IS A SOUP TO NUTS COOKBOOK THAT PROVIDES RECIPES FOR THESE AND OTHER LAND USE CONTROL METHODS.

ON THE SECOND: REMINDING COMMUNITIES OF THE ECONOMIC AND TRANSPORTATION VALUE OF THEIR AIRPORTS: SOMEWHERE BETWEEN THE EARLY DAYS OF AVIATION WHEN A MUNICIPALITY WAS WILLING TO GIVE ITS EYE TEETH TO GET AN AIRPORT, AND TODAY'S NO GROWTH AND ENVIRONMENTAL PHILOSOPHIES, MANY OF OUR CITIES AND TOWNS HAVE FORGOTTEN OR LOST SIGHT OF THE VALUE OF THEIR AIRPORT. I AM CONVINCED THAT MY JOB OF PERSUADING A PLANNING BOARD THAT A CERTAIN PARCEL OF LAND OUGHT TO BE REZONED TO PROHIBIT RESIDENTIAL DEVELOPMENT WOULD NOT BE SO DIFFICULT IF THE PLANNING BOARD MEMBERS AND OTHER LOCAL OFFICIALS COULD SEE A DIRECT RELATION BETWEEN THE NEED TO PROTECT THE AIRPORT ON ONE HAND, AND THE ECONOMIC BENEFIT OF THE AIRPORT TO THEIR COMMUNITY, ON THE OTHER. THIS CAN BE TOUGH BECAUSE IT IS NOT ALWAYS EASY TO QUANTIFY THE VALUE OF OUR GA AIRPORTS. MANY OF THEM JUST ABOUT BREAK EVEN, SO THEY ARE NOT DIRECTLY ENRICHING THE LOCAL COFFERS; AND A GOOD DEAL OF TAX EXEMPT LAND IS INVOLVED. WHAT WE'VE BEEN DOING IS POINTING TO AIRPORTS AS GENERATORS OF JOBS BOTH ON AND OFF THE AIRPORT; AND AS AIR TRANSPORTATION ASSETS THAT CAN HELP ATTRACT INDUSTRY TO AN AREA. BESIDES DOING THIS THROUGH PAPERS, ARTICLES, AND TALKS, WE HAVE STRONGLY RECOMMENDED THAT AIRPORT MASTER PLANS IDENTIFY AN AIRPORT'S PRESENT AND POTENTIAL ECONOMIC ROLE. IN ADDITION, WE'VE BEEN PUSHING AIRPORT INDUSTRIAL PARKS AS AN EXTREMELY COMPATIBLE LAND USE.

ON THE THIRD: JAWBONING AND MORAL SUASION CAN BEST BE ILLUSTRATED BY AN EXAMPLE. ABOUT THREE YEARS AGO, THE CITY OF WORCESTER ANNOUNCED PLANS TO BUILD AN INDUSTRIAL PARK ON AIRPORT PROPERTY AND LAND ADJACENT TO ITS AIRPORT, A PROJECT WHICH WE APPLAUDED. THE PLANS CALLED FOR A RATHER SOPHISTICATED LIMITED ACCESS HIGHWAY TO BE BUILT TO THE AIRPORT. SHORTLY AFTER THE HIGHWAY PLAN SURFACED, AN ABUTTING LAND OWNER TOOK STEPS TO GAIN SUBDIVISION APPROVAL FOR ALMOST 500 HOMES TO BE BUILT ON A PARCEL OF LAND WHICH WOULD BECOME DEVELOPABLE ONCE THE ROAD WAS COMPLETED. SINCE THE COMMONWEALTH OF MASSACHUSETTS HAD NO LEGAL AUTHORITY TO PROHIBIT SUBDIVISION APPROVAL BY THE CITY OF WORCESTER, WE APPLIED WHAT I CALL JAWBONING AND MORAL SUASION. FROM OUR DOT SECRETARY ON DOWN, WE POINTED OUT THE CITY'S WOULD BE INCONSISTENCY OF PROMOTING AN INDUSTRIAL PARK ON ONE SIDE OF THE AIRPORT WHILE PERMITTING HOUSES ON THE OTHER. LOCAL PILOTS APPLIED PRESSURE; AND WE COMMENTED VIGOROUSLY THROUGH THE A-95 REVIEW PROCESS. I WAS FAIRLY NEW AT MY JOB, AND I WAS DETERMINED NOT TO LET THIS SLIP THROUGH THE CRACKS. IT JUST SO HAPPENED THAT IN THE 1976 RENEWAL BY CONGRESS OF THE AIRPORT DEVELOPMENT AID PROGRAM (ADAP), ACQUISITION OF LAND OR INTERESTS THEREIN NEAR AN AIRPORT FOR NOISE COMPATIBILITY PURPOSES WAS ADDED AS AN ITEM ELIGIBLE FOR UP TO 90% FEDERAL FUNDING. WE IMMEDIATELY PREPARED A GRANT APPLICATION FOR THE CITY OF WORCESTER TO ACQUIRE THE PARCEL, AND I ENTHUSIASTICALLY SUGGESTED TO THE CITY MOTHERS (AND FATHERS) THAT I THOUGHT WE COULD GET

THE DESIRED FEDERAL FUNDING. AS IT TURNED OUT, WORCESTER DID NOT GET ANY FEDERAL MONEY FOR REASONS WHICH I WILL GO INTO LATER. THE UPSHOT OF OUR STATE JAWBONING WAS THAT THE CITY--VERY MUCH TO ITS CREDIT--SPENT ABOUT $160,000 OF ITS OWN MONEY TO BUY ABOUT 130 ACRES. I AM TOLD THAT THANKS TO MY POLLYANNA PROMISES OF "OH, I'M SURE WE CAN GET FEDERAL FUNDING FOR YOU," WORCESTER HAS UNOFFICIALLY NAMED THIS PARCEL THE LUCIE SEARLE MEMORIAL PARK!

ON THE FOURTH: INVOLVING NEW RECRUITS IS MY WAY OF SAYING THAT, AT LEAST IN MASSACHUSETTS, WE HAVE TO DO A BETTER JOB OF GETTING HELP FROM PEOPLE WITH LAND USE EXPERTISE, SUCH AS LOCAL PLANNING DEPARTMENTS AND BOARDS, STATE AND REGIONAL PLANNING AGENCIES; THE REAL ESTATE INDUSTRY, AND OTHERS. WITH A STAFF OF 13, THE MASSACHUSETTS AERONAUTICS COMMISSION IS TYPICAL OF MOST STATE AVIATION AGENCIES, AT LEAST OF THOSE THAT HAVE NOT BECOME SUBSUMED BY THEIR STATE DEPARTMENTS OF TRANSPORTATION. OUR STAFF IS MADE UP PRIMARILY OF ENGINEERS AND PILOTS WHICH IS FINE, BUT THAT MEANS WE NEED TO MAKE CONTACT WITH THOSE FOLKS WHO CAN DO FOR LAND USE WHAT MY AGENCY DOES FOR AVIATION.

HERE ARE A COUPLE OF EXAMPLES: LIKE MOST STATES, MASSACHUSETTS IS DIVIDED INTO REGIONAL PLANNING AGENCIES WHICH ARE A "NATURAL" FOR ALL KINDS OF AIRPORT PLANNING BECAUSE THESE AGENCIES WORK WITH ALL OF THE MUNICIPALITIES IN A REGION RATHER THAN JUST THE COMMUNITY IN WHICH THE AIRPORT IS LOCATED. AND AIRPORTS ARE A REGIONAL, NOT A MUNICIPAL, FACILITY. TRADITIONALLY, THESE AGENCIES HAVE BEEN HIGHWAY ORIENTED BECAUSE THEIR FUNDING COMES FROM HIGHWAY MONEY. TO MAKE IT MORE ATTRACTIVE FOR THESE AGENCIES TO DO AVIATION PLANNING, THERE IS A BILL BEFORE CONGRESS THAT WOULD PROVIDE MONEY FOR THE HIRING OF AVIATION PLANNERS BY

THE NATION'S REGIONAL PLANNING ORGANIZATION.

NOW FOR A MORE SPECIFIC EXAMPLE: BEVERLY AIRPORT, AND ITS ENVIRONS, WHICH I TALKED ABOUT EARLIER, HAS BEEN THE SUBJECT OF A JOINT LAND USE STUDY, CONDUCTED BY THE GREATER BOSTON REGIONAL PLANNING AGENCY AT THE REQUEST OF THE THREE COMMUNITIES WHICH HAVE THE AIRPORT AS THEIR COMMON BOUNDARY. THE METROPOLITAN AREA PLANNING COUNCIL FINISHED THEIR WORK JUST IN TIME FOR ME TO BRING A FEW COPIES ALONG TO SHOW YOU. WE DO NOT AGREE WITH ALL THEIR FINDINGS AND RECOMMENDATIONS, BUT THE IMPORTANT POINT IS THAT THE REGIONAL PLANNING STAFF GOT INVOLVED IN AND APPLIED THEIR SKILLS TO HELP RESOLVE SOME OF THESE FRUSTRATING AIRPORT/LAND USE ISSUES. THEY ACTUALLY MET WITH THE BEVERLY AIRPORT COMMISSION--POSSIBLY A FIRST--AND I SUSPECT THEY NOW KNOW A GOOD DEAL MORE ABOUT AIRPORTS. THIS IS WHAT I MEAN BY ATTRACTING AND INVOLVING NEW RECRUITS.

LAND USE CONTROLS, AS I STATED AT THE OUTSET, ARE, UNDOUBTEDLY, A LOCAL AND STATE RESPONSIBILITY; BUT WHAT ABOUT THE FEDERAL ROLE THAT I ALLUDED TO EARLIER. HERE ARE SOME IDEAS FROM THE STATE PERSPECTIVE, VIS-A-VIS GENERAL AVIATION AIRPORTS. MONEY, OF COURSE, IS ALWAYS WELCOME. IT SEEMS TO ME THAT WE NEED TO BE ABLE TO ACQUIRE LAND OR INTERESTS THEREIN AROUND THOSE AIRPORTS THAT DO NOT HAVE SERIOUS NOISE PROBLEMS NOW. IT IS UNLIKELY THAT THIS WILL HAPPEN UNDER THE EXISTING FEDERAL GUIDELINES.

TO GIVE YOU AN EXAMPLE, I HAVE TO GO BACK TO MY EARLIER WORCESTER STORY. I EXPLAINED THAT THE 1976 RENEWAL OF ADAP PERMITTED FEDERAL FUNDING OF UP TO 90% TO BUY LAND OR EASEMENTS FOR AIRPORT NOISE COMPATIBILITY. HOWEVER, WHEN THE FAA REGULATIONS TO COVER THIS FINALLY EMERGED, IT WAS PRETTY CLEAR THAT

WORCESTER WOULD NOT QUALIFY BECAUSE THE NOISE LEVELS THERE WERE AND ARE NOT HIGH ENOUGH ACCORDING TO THE FAA GUIDELINES. ALTHOUGH WORCESTER IS AN AIR CARRIER AIRPORT--IT HAS TWO FLIGHTS A DAY BY DELTA--ITS OPERATIONS ARE ALMOST ENTIRELY GENERAL AVIATION, AND IT ILLUSTRATES WELL THIS DILEMMA OF AN AIRPORT THAT IS NOT NOISY ENOUGH TO TAKE ADVANTAGE OF FEDERAL FUNDING.

AGAIN, ON THE NATIONAL LEVEL, THIS IS THE THIRD YEAR CONGRESS HAS CONSIDERED FEDERAL NOISE LEGISLATION. EACH BILL HAS CONTAINED PROVISION FOR LAND USE COMPATIBILITY PLANNING, BUT THE BILLS APPLY ONLY TO AIR CARRIER AIRPORTS.

IT IS NOT MY INTENTION TO BE CRITICAL OF FAA OR CONGRESS ON THIS SCORE BECAUSE IT WOULD BE IMPOSSIBLE TO FUND ALL THE POTENTIAL LAND USE REQUESTS. NOISE IS NOISE AND IT IS UNDERSTANDABLE THAT FAA GUIDELINES FAVOR THE MORE NOISY AIRPORTS. THE POINT IS THAT THIS USUALLY LEAVES OUT GA AIRPORTS.

IT SEEMS TO ME THAT ONE WAY OUT OF THIS BIND IS THROUGH BLOCK GRANTS TO THE STATES, AND THERE IS REASON TO BE OPTIMISTIC HERE BECAUSE EACH OF THE PROPOSALS TO RENEW ADAP--THAT OF SENATOR HOWARD CANNON, THE ADMINISTRATION, AND THE NATIONAL ASSOCIATION OF STATE AVIATION OFFICIALS--PROVIDES FOR BLOCK GRANTS.

IN ANOTHER AREA, THE FEDERAL GOVERNMENT COULD MAKE LIFE EASIER FOR ALL OF US BY ELIMINATING THE ALPHABET SOUP WE HAVE TO DEAL WITH AND DESIGNATING ONE SYSTEM FOR MEASURING NOISE AND DESCRIBING ITS IMPACT.

OBVIOUSLY, I HAVE CONCENTRATED MORE ON THE LAND USE APPROACH TO NOISE ABATEMENT BECAUSE I BELIEVE IT IS THE MOST DIFFICULT TASK AND ALSO BECAUSE IT HAS BEEN SINGLED OUT--AS I BELIEVE IT SHOULD BE--IN THE TITLE OF THIS CONFERENCE.

Now, to recap what I have said. Yes, we do have a noise problem at our General Aviation airports. The solutions are well known, and they have been around for some time.

We could, in some cases, improve our tools.

- SOURCE CONTROL is primarily a federal and industry responsibility. We need to make much better use of the available technology, and standards for light props must be tightened.
- OPERATING PROCEDURES, which can provide meaningful noise relief to airport neighbors now, are site specific. The main exception is the NBAA procedures, based on power management, which are applicable at any airport. The major task is spreading the word among pilots and getting them to use the procedures. The aviation press has helped on this score, particularly *Business and Commercial Aviation* which runs a monthly noise column. We could use more help from the FAA tower controllers.
- LAND USE CONTROL requires action from local governments which thus far has been the weakest link in the chain. Although we were unsuccessful, other states should seriously consider legislation which would give them clout in this predominantly local matter.

Our ability to purchase land near GA airports for noise compatibility would be improved if the chances were better of getting federal money to help do the job. Toward this end, we need to see that block grants to the states are provided for in the renewed ADAP.

THE NOISE ASSOCIATED WITH GENERAL AVIATION ACTIVITY

BILL GALLOWAY
Principal Consultant
BOLT, BERANEK & NEWMAN, INC.
Canoga Park, California

OCTOBER 3, 1979

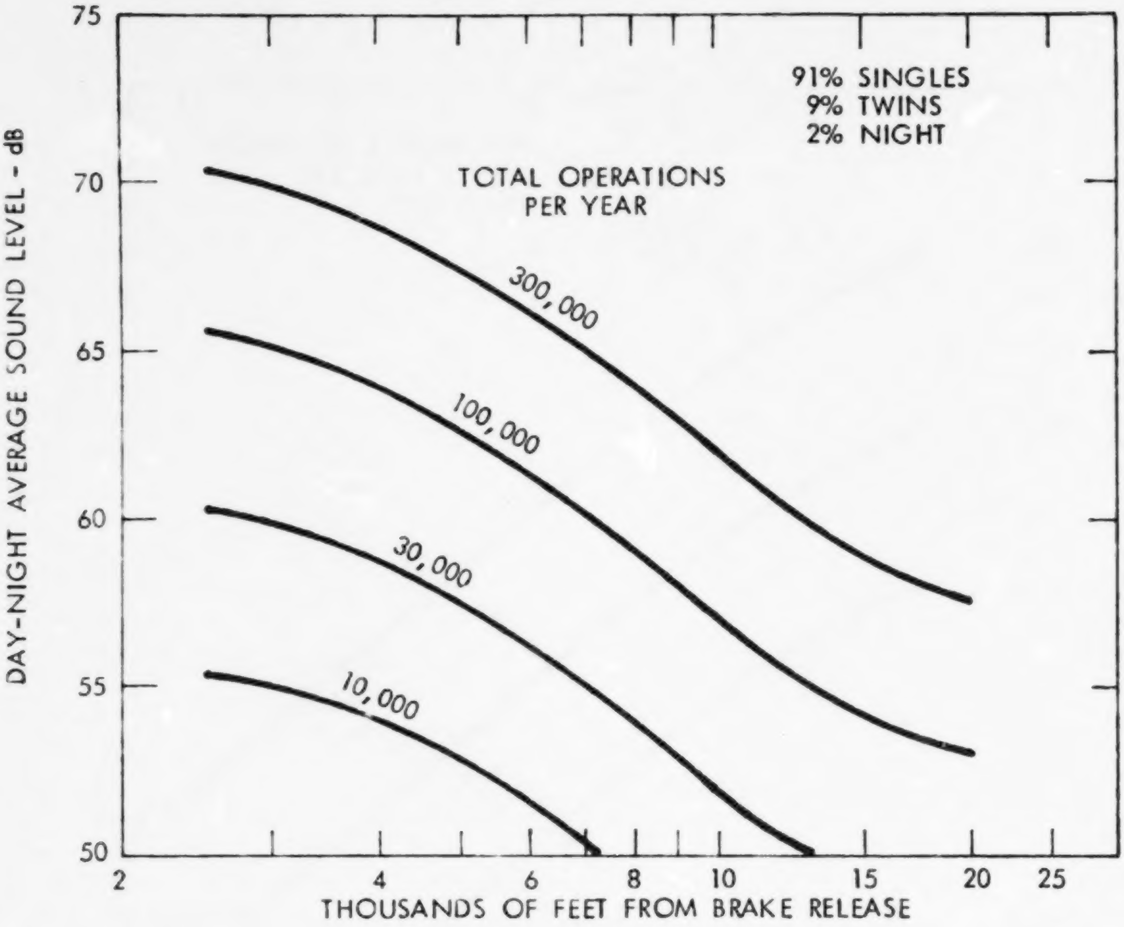
SOUND EXPOSURE LEVELS AT 6500 FEET FROM BRAKE RELEASE ON TAKEOFF FOR REPRESENTATIVE GENERAL AVIATION AIRCRAFT

Props

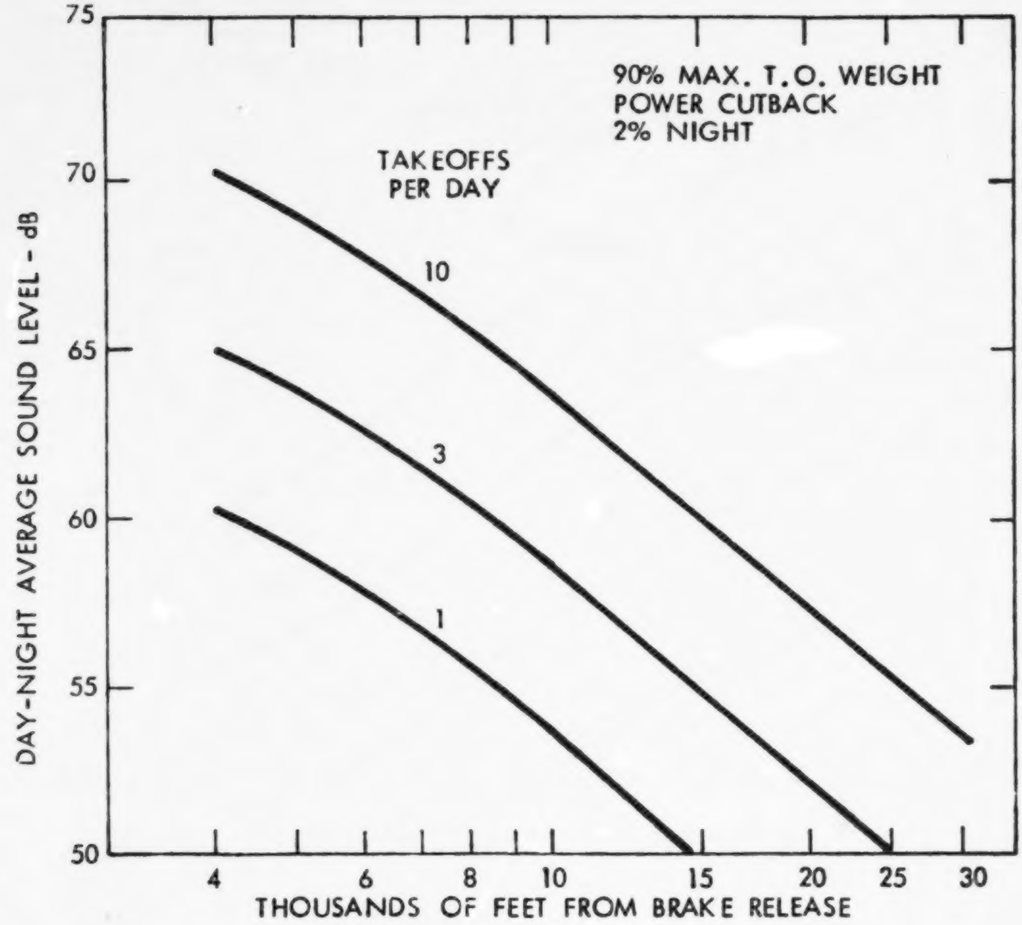
Aero Commander 560E	102
Beech B80	101
Beech V35	96
Cessna 210L	95
Cessna 310Q	95
Aerostar 601	94
Beech 58P	94
Cessna 207A	94
Cessna 401	94
Cessna 414	94
Piper PA-32-300	94
Piper PA-23-250	93
Cessna P210N	93
Cessna A185F	92
Beech A200	91
Beech 76	90
Cessna 182	89
Cessna T337H	89
Cessna 421B	88
Mitsubishi Mu-2N	87
Mooney M20	85
Piper PA-34-200T	84
Cessna 182Q	82
Piper PA-28-140	76
Cessna 172N	75
Grumman AA-5	73
Rockwell 690B	69
Cessna 150	68
Cessna 152	65

Jets

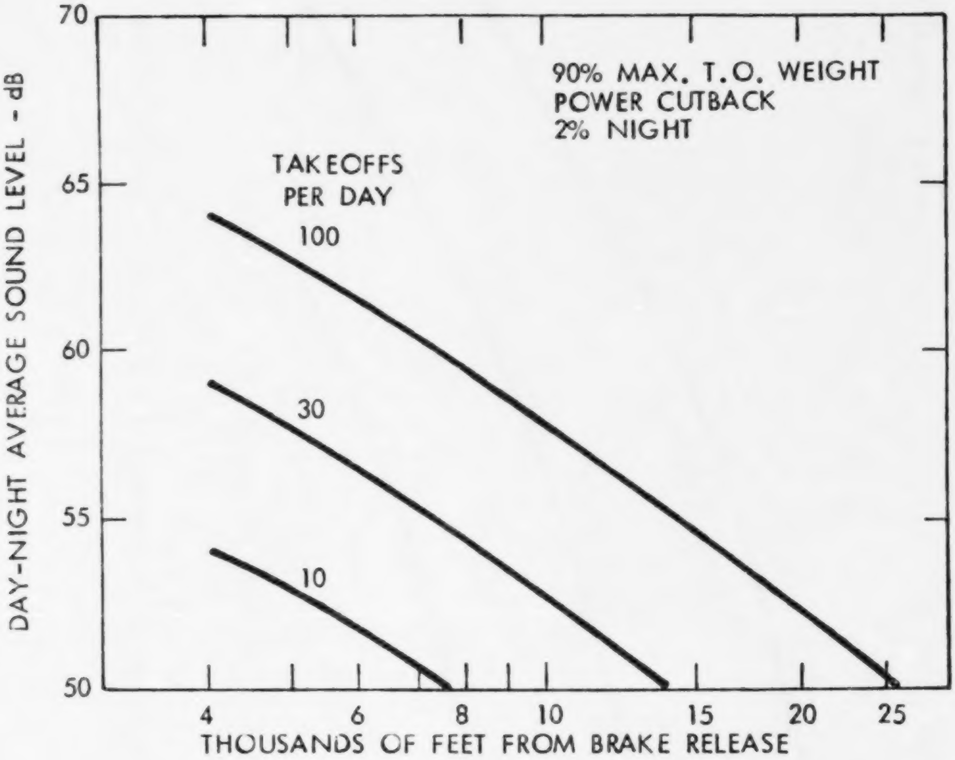
HS-125	112
Jetstar I	110
Jet Commander	109
Learjet 25	105
Gulfstream II	104
Sabreliner 60	104
Falcon 20	102
Learjet 24	100
Jetstar II	94
Sabreliner 65A	93
Falcon 10	90
Learjet 35	89
Citation II	86
Citation I	85



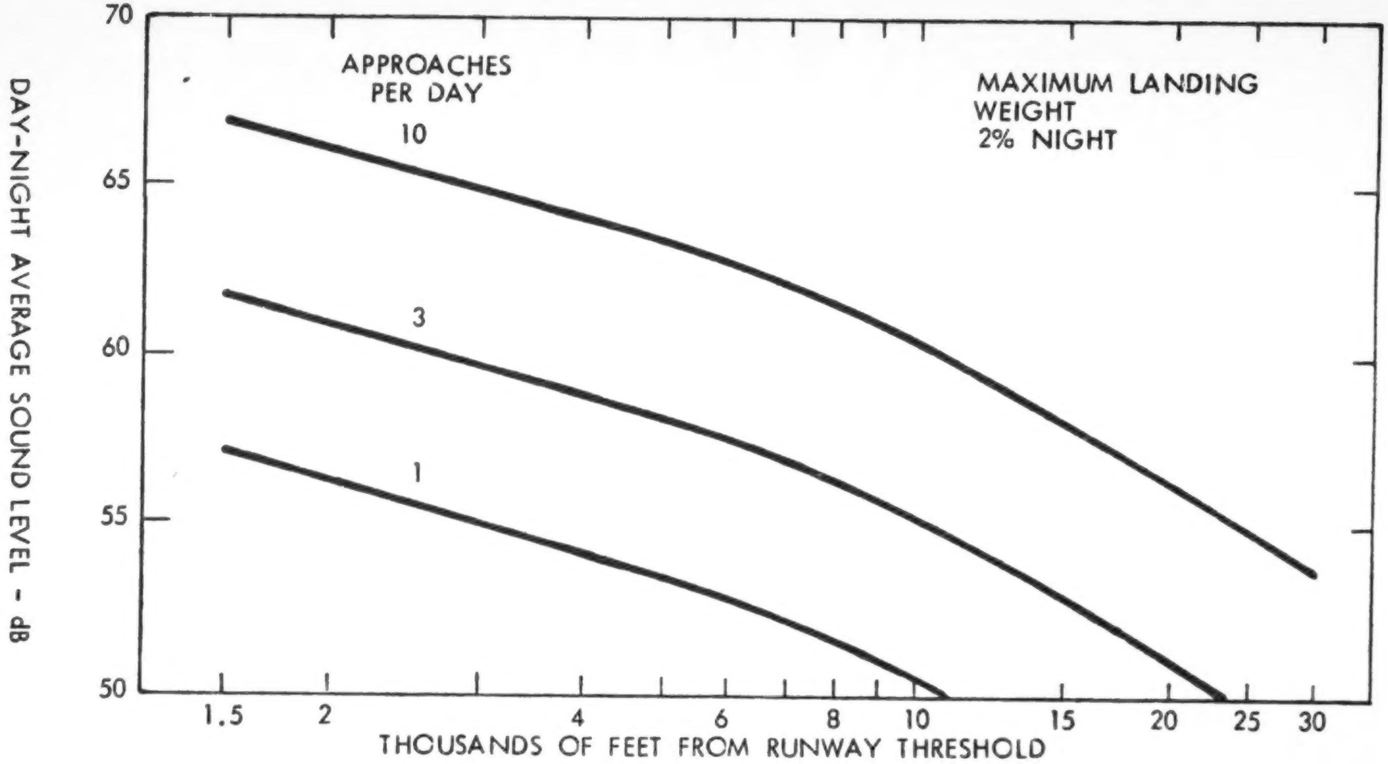
TAKEOFF NOISE FROM PROPELLER - DRIVEN SMALL AIRCRAFT



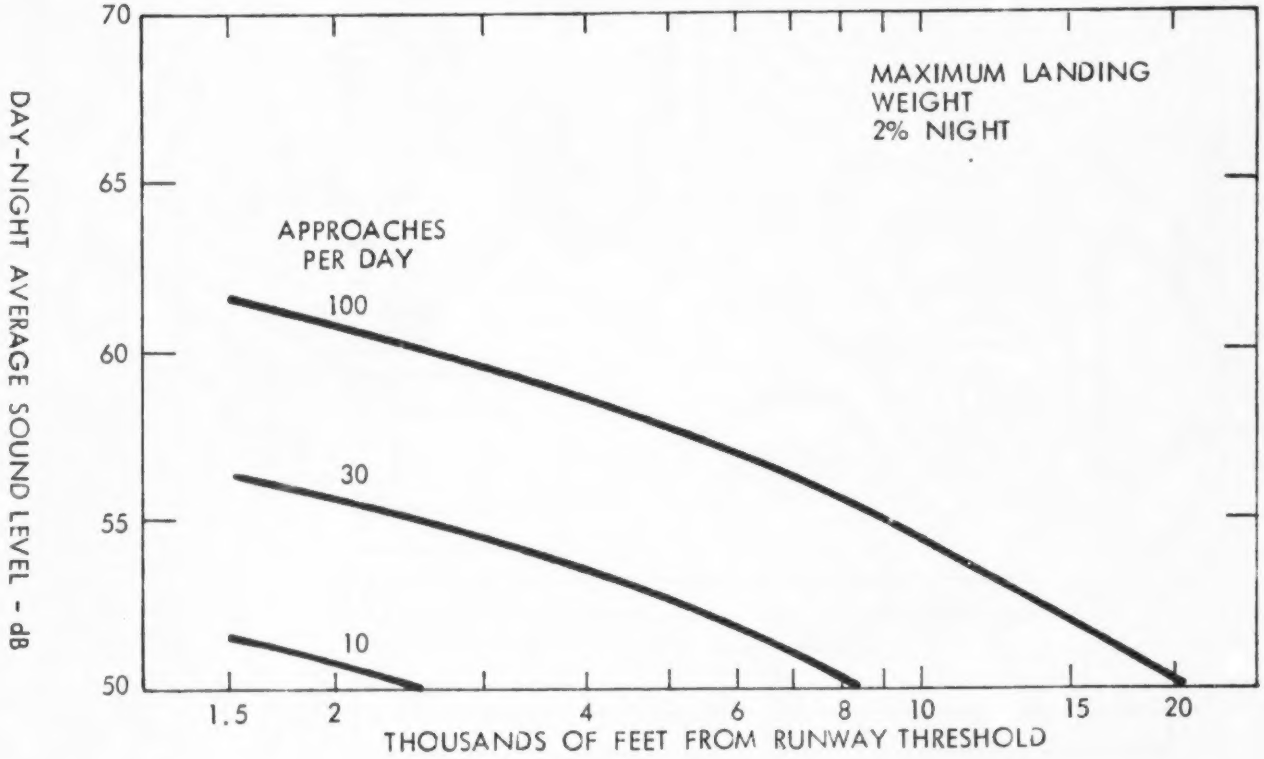
TAKEOFF NOISE FROM COMPOSITE BUSINESS JET -
1978 FLEET



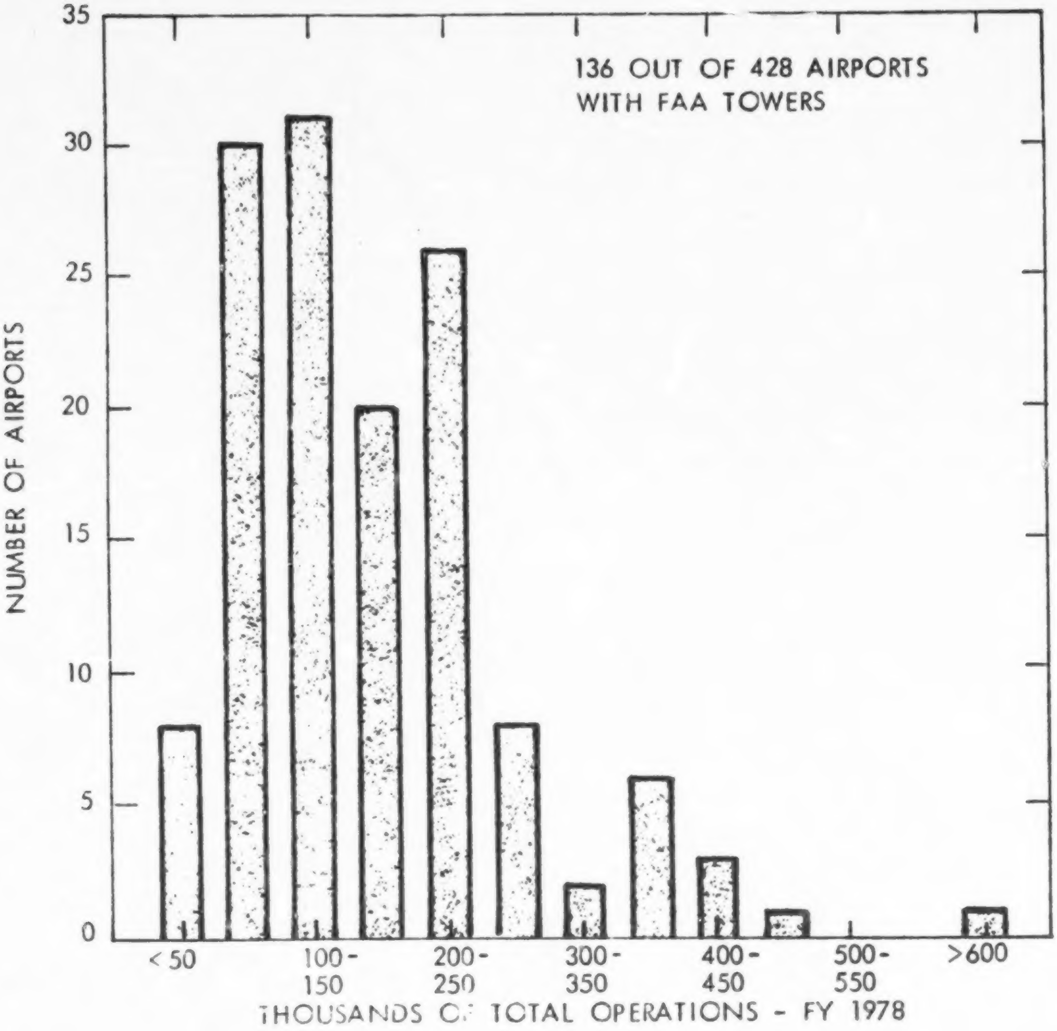
TAKEOFF NOISE FROM COMPOSITE BUSINESS JET - CURRENT TURBOFANS



APPROACH NOISE FROM COMPOSITE BUSINESS JET - 1978 FLEET



APPROACH NOISE FROM COMPOSITE BUSINESS JET - CURRENT TURBOFANS



AIRPORTS WITH FAA CONTROL TOWERS AND LESS THAN 1500 AIR CARRIER OPERATIONS PER YEAR IN FY 1978, LESS THAN 10% MILITARY OPERATIONS

APPROXIMATE EFFECTIVE NUMBER OF PROPELLER-DRIVEN SMALL AIRCRAFT REPRESENTED BY ONE LARGER AIRCRAFT IN COMPUTING DAY-NIGHT SOUND LEVEL

	APPROACH 1500 FEET	TAKEOFF 6500 FEET
MEDIUM RECIP. TWINS	2.5	1.6
SMALL TURBOPROPS	1.6	25
DHC-6 TWIN OTTER	8	8
LARGE TURBOPROPS	200	25
DC-9-30/737-100, 200	125	400
737-200QN	16	400
727-100	200	800
727-100/200QN	25	630
BUSINESS-TURBO JETS	160	80
BUSINESS-MED. TURBOFANS	16	8
BUSINESS-NEW TURBOFANS	2.5	1.6

"The Impact of General Aviation Activity on a Local Economy"

REMARKS BY MICHAEL J. MCCARTY, MANAGER,
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NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

CONFERENCE ON GENERAL AVIATION AIRPORT NOISE AND
LAND USE PLANNING

Atlanta, Georgia
October 3, 1979

It's a pleasure to be here today and have this opportunity to describe what impact general aviation has on the Country's economy. For one reason or another, there seems to be a mysterious cloud which lingers over the people's vision of what role general aviation activity and the community airport plays in their every day lives. Part of this mystery can be resolved simply by realizing what general aviation really stands for.

"General aviation" itself is that very loose and misleading term which is usually associated with everything except the airlines and military. That means that private business aircraft, air taxis and charters, air freighters, contract carriers, mail plans, pleasure and acrobatic aircraft, flight trainers, crop dusters, banner towing, construction helicopters, blimps, free baloons, gliders, frisbies and high flyballs to rightfield are all placed in the general aviation category.

With all this activity, no wonder general avaiation accounts for 98 percent of the active aircraft, 87 percent of the total hours flows, 65 percent of the aircraft miles flown, and 81 percent of all aircraft operations. It's necessary, however, to go beyond all this and attempt to identify, in one word, what a majority of general aviation is all about. The word I keep coming back to is "business"— that's right, general aviation means business.

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Two years ago, the St. Louis Globe-Democrat took a survey to identify what function the general aviation activity in the area was serving. The Globe found that 72 percent of the activity was for business and commercial purposes, 23 percent was for personal transportation and proficiency training, and only 5 percent for pleasure.

Now, as I represent the business flying which is under this general aviation umbrella, I would like to narrow my text to this specific area. I also believe it would be helpful to briefly describe the business fleet and why companies use aircraft.

There are today some 50,000 business aircraft in the United States, of which nearly 10 percent are turbine powered. This is approximately 27 percent of the total general aviation fleet.

A recent study by an independent research firm shows that, of America's top 1,000 industrial corporations as listed by FORTUNE Magazine, 514 now operate their own business aircraft—a total of 1,773 planes. This compares with less than 450 companies just four years ago!

BUSINESS WEEK Magazine last year pointed out that "Corporate aircraft are radically transforming the way many companies do business. And they are helping to change the geographical tilt of the United States economy, as more companies build plants without regard to the rigid corridors of public transportation." This article also stated that "The impact of corporate flying, moreover, may grow more than the sheer numbers growth would indicate. Increasingly, U.S. companies are using their aircraft as sophisticated tools that do more than simply haul top brass from point-to-point in comfort."

A few examples of company use of business aircraft are:

Oxford Industries, Inc., an Atlanta-based apparel maker that uses a twin-engine Beechcraft to fly department store personnel to its plants where they can oversee orders being produced. According to the firm's Vice Chairman, giving buyers commercial airline tickets would not work because the company's 38 plants are scattered across six southeastern states—many in towns with grass airstrips that lack commercial service.

Xerox Company is reported to fly 15,000 employees a year on a company owned shuttle plane between its Stanford headquarters and its Rochester, New York, plant—saving $410,000 a year over commercial airfares and cutting travel time as well.

One of the key reasons why more and more businesses are turning to the use of their own aircraft is that airline service is declining--both in numbers of flights and in points served. According to CAB figures, the certificated airlines now serve only 400 points in the Continental United States—a 30 percent decrease from the 567 served in 1960.

As things stand today, the company airplane may well be the only link for a manager in reaching more than 19,000 unincorporated communities, and even 379 cities with populations of over 25,000 that do not have any airline service.

There are, of course, many reasons other than declining ariline service for more and more companies to add aircraft to the company inventory of productive tools. But they usually net down to the convenience, mobility, and flexibility that allow managers to increase that radii of action...to decentralize their plant, warehousing, and marketing structures...to diversify their scope of operations...compete in unpenetrated markets...and to maximize the potentials of plant locations through greater mobility for managers.

The company aircraft can be scheduled to go where the manager wants to go, when he wants to get there; and "there" may be someplace not even served by commercial airlines.

The company aircraft usually provide an office environment that increases management productivity. It is a very common enroute work pattern for a two to four man conference to be held. Or individual executives can empty the briefcase of work while traveling--something they would hesitate to do in the close-quarters setting of a commercial flight. Or, they may plan their business call at the destination city, or prepare their formal trip reports on the way home. In fact, the chief executive officer of one of our larger NBAA member companies says that "...using the company plane is a sneaky way of getting more working time out of our executives."

And, of course, there are the obvious advantages. No time need be lost waiting for the next scheduled flight once business is concluded. Conversely, no efficiency need be lost because sufficient time cannot be allowed to complete the business because the executive must "catch a plane."

From the self-serving point of view of the businesses themselves, it would appear that the use of aircraft is a productive addition to the corporate economy. But, by now you are probably asking what all this has to do with the impact business aviation has on the national economy? What is the public benefit from general aviation activity?

Unfortunately, this has never been measured in any great depth by anyone—including the Federal Aviation Administration. However, by sampling some individual situations around the Nation, it is possible to get a feel for the contributions made by aviation in general, and business aviation in particular.

In Ohio, for example, a statewide airport program was initiated in 1965 with $6.2 million in State funds, and matching monies from the localities involved—a start-up total of $12.4 million. Sixty-four counties participated by building new airports and improving existing facilities. When the State later conducted an evaluation of the program, the following specifics were determined:

At 20 new airports created under the program, almost half of all landings and takeoffs being made were by corporate aircraft and commercial cargo planes.

More than half of 150 manufacturing firms selected at random throughout the state use their air transportation facilities frequently.

The counties with new airports had a three-percent higher payroll rate increase after completion of the airport than did the counties which did not participate.

Extrapolating from the experience of participating counties, compared with non-participating counties, it appears that over a four-year period, Ohio netted $250 million in additional personal income, and created more than 60,000 new jobs by virtue of the airport development program. That is a benefit-to-cost ratio of 20 to 1.

On a national basis, the JOURNAL OF COMMERCE on March 27, 1978, reported on the growth of the corporate aircraft fleet, and stated that, "...over 1,000 plants in the last three years have been located in areas distant from major city airports. Decentralization makes it tougher to keep tabs on operations without bloating the executive ranks. In addition, the airports with airline service are dwindling."

Many towns and communities nationally recognize this. Lee's Summit, Kansas, for example, recently purchased a private airport for the City, and is extending the runway from 2,400 to 3,000 feet to accommodate twin-engine aircraft. The stated purpose is to make the airport an attraction for industry.

Dr. A. Erskine Sproul, Chairman of the Shenandoah Valley Airport Commission, at Staunton, Virginia, reported that 20 new industries employing at least 4,000 people have moved into the area in the last 17 years, and airport facilities were listed as a prerequisite by all of them.

The Milan, Tennessee, MIRROR, reported last year on Gibson County's opening of a new airport with a 4,500 runway to "handle all business jets and piston driven planes..." Mr. Argyle Graves, Chairman of the Airport Commission, was quoted as saying, " Seventy-five percent of prospective plants use jets, and I know of one big plant which bypassed Milan and went to a neighboring Tennessee town because they had adequate airport facilities. Contrary to what many people think," Mr. Graves continued, "airports are not a luxury enjoyed by a few. They have become vital links for the business world. With the new facilities at Gibson County Airport, a business executive can fly to Chicago and back and transact his business in less than eight hours. I feel that that airport will be one of the county's greatest assets."

In 1978, the Santa Barbara, California, NEWS PRESS ran a roundup on local airports and what they contribute to the economy. They stated that because of industry located on the airport, the Santa Maria Public Airport provides jobs for 1,600 area residents. It makes possible private and airline transport to cattlemen and vegetable producers. Columbia Records uses it for air freight service; oil companies use it as a staging airport for geologists in the area. The report also included the Lompoc Airport, with a 3,600 runway, and states that this airport has 16 persons employed on it with an annual payroll of $100,000.

The Oxnard, California, PRESS-COURIER reported that the Camarillo Airport, with 90,000 takeoffs and landings in 1977, generated $310,000 in revenue--more than it costs the county to operate the airport. It also generated $64,000 in local taxes. In addition, tenants at the airport employ approximately 390 persons with a payroll of over $3,5 million annually.

At Odessa, Texas, the Airport Board surveyed 135 businesses selected at random in the area and found that 46 percent of the companies had customers, business associates, or company personnel who travel to and from Odessa by business aircraft. This represents a passenger flow of 385 passengers a month traveling by other than scheduled aircraft. Over 50 percent of the business that operate aircraft to Odessa stated that additional facilities would encourage more use of the airport.

The Santa Ana, California, Chamber of Commerce sent questionnaires to 1,000 randomly selected business in the area and received 518 replies. Seventy-one percent of the replies showed a need for air transportation facilities. Twenty-eight percent of the 518 companies said the Orange County Airport had influenced in the decision to locate within the County.

Twenty-five percent said they use general aviation aircraft, and average ten flights per month. Of that group, roughly 40 percent--or 51 companies--had their own aircraft; the remainder chose to use charter flights.

All these examples support the finding of a U.S. Department of Commerce survey which polled 3,000 manufacturing firms to determine factors influencing industry location decisions. The availability of air service and preferred community size were two survey items. For 11 percent, availability of air service was considered critical; and for 17 percent, significant. Cities of under 25,000 were the preferred size for 20 percent of the firms, with 38 percent choosing cities of 50,000 or less.

Another survey of leading United States firms revealed that 80 percent would not locate a plant in an area lacking an airport, and 57 percent indicated that the airport should be capable of handling heavy twin engine aircraft.

In addition to bringing business into a community and helping local people to conduct business outside the community, airports bring very tangible benefits to the entire population. The access an airport provides and the employment opportunities it offers are easily recognized. Less apparent, perhaps, but no less important are:

1. Value of time saved (by passenger plus "domino effect")
    (a) Business flying
    (b) Pleasure flying
    (c) Utility flying

2. Emergency value (human life and property)
    (a) Natural disaster (earthquakes, floods, wind and weather)
    (b) Crime control and law enforcement
    (c) Riots and civil disturbance
    (d) Rescue and life savings
    (e) Forest fire fighting

3. National defense value
    (a) Pilot training and availability
    (b) Value to war time combat use
    (c) Civil Air Patrol

4. Promotion or stimulation of air carrier flying — provides valuable feeter traffic

5. Entertainment value
    (a) Value to general aviation passengers (in terms of gratification)
        1) Air shows
        2) Radio, TV, movies
        3) Vacation and resort area development
        4) Sightseeing and other transportation modes

(b) Value to entertainment industry

6. General business industry associated with general aviation travel

(a) Hotels

(b) Ground transportation (taxi, limousine, car rental, etc.)

(c) Meals

7. Specific benefits related to general aviation

(a) Aerial photography and mapping

(b) Fish spotting and fish savings

(c) Forest fire patrol

(d) Power and pipeline patrol

(e) Corporation internal business aircraft management, maintenance, and operations, personnel and expenses.

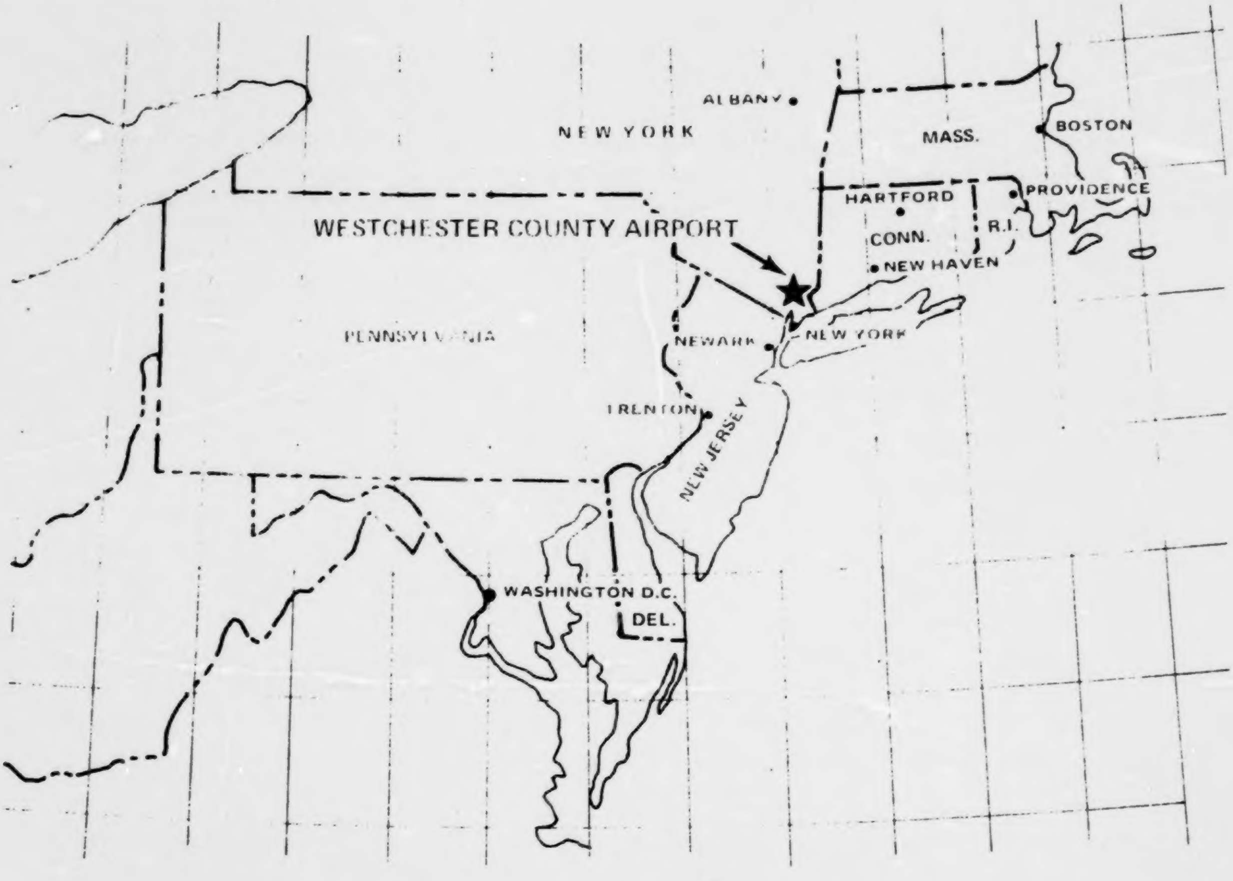
The local airport is rapidly becoming the principal gateway to the Nation's modern transportation system. Communities large and small are realizing that to be without air service today is as detrimental to their development as being bypassed by the railroads was a century ago, or left off the highway map 25 years ago.

Communities that are not readily accessible to the airways may suffer penalties that can effect every local citizen--whether he flies in a general aviation aircraft, uses commercial airlines, or never has occasion to travel at all.

The role of the general aviation airport in providing air access is increasing. By having access to all the Nation's airports, general aviation aircraft can bring the benefits and values of air transportation to the entire country.

THROUGHOUT THE COUNTRY, AIRPORTS AND GENERAL AVIATION MEANS BUSINESS.

THE WESTCHESTER EXPERIMENT


ALBANY
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U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Office of Environmental Quality
Washington, D.C.20591

NOTICE

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WESTCHESTER EXPERIMENT

Ever since the aircraft ceased to be an interesting curiosity to those on the ground, resident annoyance with noise has been the subject of vigorous complaint. For years, the owners, operators and users of airports and the Federal Government failed to deal with noise complaints and looked at residents as irrational and unreasonable. Residents on the other hand took a conspiratorial view of noisemakers.

Blasted by noise which took away their peace and tranquility, and faced with little or no response from the airport community, frustration set in.

Thus, the scene was set for confrontation between two desperate groups, the airport and its neighbors, neither one fully understanding nor trusting the other.

Westchester County (N.Y.) Airport (WCA) on the Connecticut border provided a testing ground for the understanding and coalition of these two groups, and for the development of noise abatement procedures with which both groups were comfortable. We call it the Westchester Experiment.

So that the Westchester Experiment may be used as a model for future action, we will describe the background of the problem at WCA, the governmental response to resident complaints and resident action in precipitating the Experiment.

Background of the Problem

The Airport:

WCA is a 700 acre general aviation airport located on the Connecticut - New York border. Like many of the general aviation facilities, it was created from a little used World War II military installation that had been located, during an emergency situation, into the midst of four well-established residential communities.

During 1976, the airport ranked fourth in total operations and second in general aviation operations in New York State.

The user group at WCA is mixed. It includes the corporate jets for many of "Fortune's 500" corporations, light aircraft for private use and for training, and commercial carriers providing scheduled service. Also, the Air National Guard has an air reconnaissance mission at WCA.

Each of the uses presented a different noise experience for the neighbors and precluded any simple solution to the noise problem.

Neighborhood Area:

The surrounding residential neighborhoods are as mixed as the aircraft at WCA. On the Connecticut side of the state line, there is a significant area of large lot development (2 to 4+ acres) with expensive homes. On the New York side, land use patterns vary by community but tend to be more dense. Lot sizes there are generally one acre or less. All of the communities have the usual combination of schools, churches, hospitals and recreational areas. There never was, nor is there now, any significant business development in the area.

The Noise:

Early in the seventies, when annual operations were at an all time high of 282,000 movements, there were four types of objectionable airport noise. Though there were other noise problems, these four were the subject of most neighborhood objection: 1) Jet operations, particularly during sleep hours from 10:00 p.m. to 7:00 a.m.; 2) High frequency jet engine run-ups; 3) Use of reverse thrust, especially at night; and, 4) The daisy-chain of light aircraft doing touch and go.

Resident Complaints and Governmental Action

Concerted resident complaints began in 1968. Prior to that time they had been sporadic. The complaints were spurred by the growth of WCA from 145,000 operations in 1958 to 254,000 operations in 1968. Furthermore, multiple uses of the airport and the increased use of jets with no discernible noise abatement procedures drove residents to bitter complaint.

Greenwich, Connecticut, residents through their Homeowner Association formally complained about aircraft noise from 1968 to 1974. Their complaints were constant and articulate. They were made orally and in writing. They were addressed to every level of government from the FAA, Eastern Region, to the owner of the airport, Westchester County, New York. Residents enlisted and received the assistance of the Town of Greenwich and of their Congressman but their complaints fell on deaf ears. There was no meaningful response. The FAA denied all authority over use of the airport; the owner claimed that the operator had authority under terms of the lease; and the operator insisted that Federal law vested the authority in the FAA and owner respectively. Thus, the residents were carefully shuttled from one authority to another in what might properly be called The Shell Game.

Citizen Action

In the spring of 1974 in total frustration over governmental deafness, the residents of northwest Greenwich hired the Westport, Connecticut, law firm of Davidson and Spirer to file a lawsuit.

Late in the summer of 1974, an action was filed in the Federal District Court in New Haven, Connecticut, (Docket B-74-280) by the Homeowner Association* against the owner and the operator of Westchester County Airport and the FAA. The citizens were joined in this action by the Town of Greenwich, Connecticut. Essentially the plaintiffs' sought $20,000,000 in damages, in addition to injunctive relief requiring an enforced noise abatement program and a curfew. Finally, the residents had the ear of Government!

In the six months following, considerable legal maneuvering took place. The important result was that in January of 1975 the airport owner, Westchester County, offered to negotiate, and the National Business Aircraft Association (NBAA) sought to participate in the negotiations on behalf of their corporate members.

To offer to negotiate was immediately rejected by the Homeowner Association for three reasons:

1) mistrust of the airport owner's motives, based on years of experience;

2) realization that unstructured negotiations were worthless; and,

3) fear that prolonged negotiations would empty the Association's treasury because of increased legal costs.

Homeowner reluctance to negotiate was eventually overcome by the NBAA and the Westchester County Pilots Association. With permission of counsel, the presidents of each of these organizations contacted the president of the Homeowner Association. A meeting was set up during which these representatives of the aviation community convinced homeowners of their sincerity and eagerness to deal with the noise problem by developing a noise abatement policy for WCA. They also conveyed the concern of both the airport owner and the Federal Government that a peaceful solution to the problem be reached.

With NBAA assurances of technical assistance and some tough negotiating between lawyers, a Stipulation of Settlement was hammered out and signed in July of 1975, one year after the lawsuit was filed. Determination by the homeowners to deal with their noise problem through the courts finally produced the long awaited result.

*Northwest Greenwich Association

The Stipulation

The Stipulation is a comprehensive document that sets forth the parties, their relationships and the conditions governing the negotiations to resolve the noise problem. In effect, it identifies the users - the people making the noise, and the residents - the people hearing the noise, as the principals in these negotiations.

The Stipulation called for the formation of a Committee consisting of these two groups to meet on a regular basis with a specified agenda (See Appendix). The Stipulation mandates that the FAA, the airport owner, and the operator serve the Committee in an advisory capacity, supplying such data as needed to deal with the noise problem objectively.

In recognition of what is now acknowledged as the airport owner's responsibility, Westchester County agreed to review, give good faith consideration and act upon all recommendations of the Committee with respect to noise abatement and safety procedures.

Negotiations under the Stipulation began in September 1975 and have continued productively to date.

Results to Date

The Westchester Experiment has produced meaningful results in terms of noise reduction. Negotiations under the Stipulation and concessions by the airport community have resulted in the following:

1. The development, printing and distribution of a noise abatement procedure for WCA. The procedure itself is the result of careful, expensive study and field testing by the NBAA using aircraft borrowed from the corporations. The procedure document is designed to be inserted in the pilot's manual and is given to all users of the airport. Work is under way to have Jeppeson, pilot's manuals, include the procedure in its regular publication.

2. A voluntary curfew of jet takeoffs from 11:00 p.m. to 6:30 a.m. This curfew has been adhered to by the majority of resident users. It has considerably reduced regional noise but homeowners feel that there is still room for improvement.

3. Elimination of reverse thrusts except in an emergency situation.

4. A voluntary reduction in touch and go operations by using smaller regional airports.

5. Prohibition of turbine engine run-ups unless an emergency exists in which case approval must be given by the airport operator. At all times specified areas of the airport are mandated for this engine work.

6. A manned, twenty-four hour noise complaint number set up by the operator with an established procedure for logging and dealing with each complaint.

7. The purchase of a portable noise monitoring unit to measure noise exposure around the residential community. Funds are now being requested for a permanent monitoring system to insure a constant noise measurement nearer the source.

8. Installation, by the owner, of instrument guidance systems to assist in compliance with noise abatement and safety procedures agreed upon at WCA.

9. Nationwide publication that WCA is a noise sensitive airport and that noise abatement procedures are in effect and must be obeyed by all pilots.

10. Representation of homeowners on the WCA Master Plan Policy Liaison Board. The Board will provide the citizen-resident input for development of a long range plan for WCA.

These results were not easily achieved. The first few meetings were tense and at times almost hostile. The hostility stemmed from the homeowners long frustration and anger, and the pilots' anxiety over the demands that might be made on them.

In retrospect, we realize that these sessions served a constructive purpose; they enabled all parties to air their resentments and realize that the problems involved were not, after all, insurmountable.

While there are many difficult issues still to be resolved, the dialogue between the airport community and the homeowners has produced objective discussion, mutual trust and an atmosphere of positive solution. The work to date has gone a long way towards making Westchester County Airport a better neighbor. Future discussions and action hopefully will make it a good neighbor, so that any future resort to the Courts will be unnecessary.

Through our experience with the Westchester Experiment we have found that reasonable people, working together, can achieve a great deal.

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APPENDIX*

The Committee shall initially consider, study and, if possible, report on the following items:

(a) Night operations at the airport between the hours of 11:00 p.m. and 7:00 a.m.

(b) Abatement of noise disturbance from engine run-ups and ground operations.

(c) "Touch and go" flight procedures.

(d) Scheduling of student pilot training.

(e) The feasibility and desirability of establishing a preferential runway system.

(f) Runway restrictions.

(g) Raising the floor under the LaGuardia Terminal Control area in and around Westchester County Airport to a minimum of four thousand feet (4,000') MLS, or above, from its current floor of three thousand feet (3,000') MSL.

(h) The safest and most desirable angle for the existing glide slope and any future glide slopes that might be installed.

(i) The installation of a VASI system on Runways 11, 29 and 16.

(j) The feasibility, desirability and possible consequences of the installation of noise monitoring equipment.

(k) Helicopter operations.

(l) Use of thrust reversers.

(m) Discussion, proposal and implementation of other practices and procedures which will reduce noise and emissions and increase safety from the operation of Westchester County Airport.

The list set forth above may be supplemented by other items which may be undertaken by the Committee.

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*The information in this appendix is contained in the Settlement of Stipulation as agreed to by all the parties in the lawsuit.

REMEDIAL MEASURES FOR DEALING WITH NOISE ASSOCIATED WITH GENERAL AVIATION ACTIVITY

By

LEWIS S. GOODFRIEND, P.E.

Lewis S. Goodfriend & Associates
Cedar Knolls, New Jersey

To provide relief from noise problems at a General Aviation Airport, or to eliminate such problems, requires the identification of the specific problems at that airport, and the development of an integrated plan for remediation. This paper first examines the nature of the GA Airport noise problem, and then outlines what remedies are available and how they may be synthesized into a noise impact control system.

The first step in remediation is the identification of the nature of the existing noise impact, and of the portion of the surrounding community for which the noise problem exists. This first step may, in itself, be the major one in remediation since conventional noise impact descriptors have not appeared to be suitable for GA Airport noise assessment[1,2]. Among the problems in applying noise descriptors are:

- Different operations at the same level cause difference responses.
- Flight tracks vary widely for the same category of aircraft at typical measuring locations, thus yielding a large spread in measured levels.
- Community response appears to occur as a complex function of flight frequency, maximum level, duration above ambient, and visibility.

This has been confirmed to some extent by Harris in his study for the Massachusetts Aeronautics Commission, and by some work performed by my own associates at Morristown Municipal and other nearby airports.

In one case, the noise complaints occur only when aircraft land at night with their lights on before they cross the airport property fence. The average daily traffic at this airport is only about four movements a day.

A quote from Harris further delineates the nature of the problem of using noise descriptors in defining and remedying GA Airport noise problems,

> - ...cumulative aircraft noise near the ambient for other noise resulted in concerted community action.
>
> These airports were all in relatively quiet areas. Serious complaints and concerted community action occurred with aircraft noise levels in the range from L_{dn} 50 to L_{dn} 55, levels far below current official standards of acceptability.
>
> - airport neighbors first complained about levels of noise exposure from touch-and-go training operations about 5 dB lower than they first complained about levels of noise exposure from normal arrivals and departures.
>
> Complaints for normal operations started when the levels of exposure exceeded L_{dn} 55. We traced most of the complaints at the small general aviation airports to the frequent touch-and-go training flights.

> Complaints about touch-and-go flights did not occur when the levels of exposure due to a touch-and-go flights were below L_{dn} 50; however, they occurred on a regular basis when exposure exceeded L_{dn} 50. At the airports we studied, there were no levels due to touch-and-go flights that exceeded L_{dn} 55.

It is probable that a careful record of community complaints is the best indicator of GA Airport noise problems. Serious noise problems can be monitored using conventional level monitoring equipment. But the use of such data to predict impact can again best be done for the specific runway on the basis of local community noise response information.

In order to relate airport operations to noise impact, detailed information on the individual GA Airports is necessary. Information includes:

1. Size.
2. Physical relationship of airport and noise-sensitive areas.
3. Traffic volume.
4. Traffic mix (prop only).
5. Presence of jet traffic.
6. Frequency of jet traffic.
7. Fixed base activities (static engine run ups).
8. Runway use.

With this information and the complaint records, it may be possible, without any acoustical information at all, to estimate the noise impact on surrounding areas. Add to these data the ambient noise levels in the area, and the actual or predicted maximum levels at the noise-sensitive locations due to aircraft operations, and the problem will almost define itself.

Experience at a number of small airports has confirmed Harris' findings with regard to touch-and-go traffic noise. If the neighbors hear it for the better part of any hour it will cause complaints. Furthermore, frequent departing flights with noise levels significantly above the ambient, cause complaints. With respect to jet traffic, it appears that there is no simple relationship between frequency of flights and annoyance. The community response appears to occur in three discrete steps:

1. Awareness of jet traffic.
2. Annoyance by jet traffic.
3. Group action against jet flights.

It is clear from this preliminary discussion, that there are few functional relationships to guide us in the assessment of the impact of GA Airport noise in the surrounding community. However, the remedial measures available are also discrete in nature, so that we are not faced with measuring a small change in noise level or impact. If we can't make a change equivalent to a five or 10 decibel reduction in level, we will see no change in the community response.

There are several generic types of remedial measures. These include political, regulatory, operational, economic, and community relations measures. Some remedial measures are accomplished through a combination of those elements listed. Political solutions are those which result from actions by municipal bodies such as the governing body or the planning board. Actions which deal with the zoning of properties around the airport on the basis of a long term local or regional plan are examples. Such political solutions are seldom feasible today because master plans have been adopted, and changing them may create hardships and inequities that result in litigation. A partial solution is the purchase of properties that are, or will be, impacted by airport traffic. But, even such land purchase can lead to litigation. However, land use planning is a continuing process and must continue to be a major element in individual airport planning. Other political remedies involve landing fees, hanger rental, and the rate of development of the airport in view of its attractiveness to both based and itinerant aircraft.

Regulatory measures include those activities which are under the control of the airport management. These include noise limits at monitoring locations and the use of curfews on aircraft not meeting published noise level standards. This is, in essence, the use of a maximum single event noise level.

The operational measures available to the airport operator include the publication and use of a preferential runway system, the use of noise abatement flight procedures, and the identification for pilots of noise-sensitive areas.

Of course, for single runway airports, the preferential runway idea isn't much help. However, flexibility in the assignment of departure headings, and close cooperation between FAA tower personnel and the airport management, can reduce the impact during high density traffic periods.

For smaller airports, touch-and-go traffic may all occur near or over residential areas. It is here that attention needs to be given to the place of flight training in the airport community relationship. It may be that airport operators will have to decide whether business traffic and aircraft maintenance activities are more important than flight training and hanger or tie-down income. It has occurred to many in the general aviation area, that some trade offs in this area may be in order. Just turn on your radio on some clear Friday afternoon and listen to the combination of student pilots, business twins, and high performance jets all in the same traffic pattern.

A combination of regulatory and operational measures has been adopted by some airports, which require the filing of applications by those wishing to operate turbine-powered aircraft into the airport, and which also require that certain procedures be followed during landing and takeoff. These procedures are published in some cases as Jeppesen-like pages.

Economic remedial measures include incentives for major corporations to maintain a good neighbor image by minimizing their fleet impact on the neighboring community. This provides strong motivation to operate quietly and to upgrade the flight with quieter aircraft.

Another economic aspect of remediation exists when the impacted community includes members of the owning companies' staffs.

At some airports, the management works closely with the neighboring communities to pinpoint those operations that appear to have the greatest impact, and with the cooperation of the FAA personnel implement noise abatement plans. Also, corporate pilots have joined together in formal organizations at some airports and, among other activities, work toward noise abatement and improved community relations. This may include assessment of operational procedures for noise abatement involving turbine-powered equipment noise, as well as participating in community activities. It has been known for many years, that noise annoyance is increased by the belief on the part of the auditor that the noise is unnecessary or can be easily abated. It is also known that good community relations is worth up to 10 dB of noise reduction. With this in mind, it is clearly important for airport managers to work at improving community relations. Programs which identify communications paths for complaints, follow-up reports on complaints, and disseminate information on studies, programs, and actions taken to improve the noise situation are very important. This means not issuing press releases, but meeting with elected officials of neighboring municipalities and community groups and bringing in the pilots organizations and FAA staff where they can hear the problem at first hand, discuss the operational aspects, and then discuss potential measures to reduce the noise impacts both in the near and long term.

There are some problem areas where the ideas that have been presented will not be easy to implement. These include:

1. Airports in one municipality that are owned by another municipality.

2. Airports on the edge of one municipality that causes noise problems in another.

3. Suburban airports initiating turbine-powered activity.

4. Airports opening new fixed base jet maintenance facilities.

Nevertheless, a program for remediation should always be available to each airport management. It should be operating before any complaints occur, and it may result in never having serious noise complaints. Such a program includes:

1. Preparation of topographic maps and aerial photographs with the expected traffic patterns overlaid.

2. Delineation of noise-sensitive areas.

3. Listing of airport telephone "information" numbers.

4. Availability of instructions for recording complaint information.

5. A noise coordinating committee to review operations, recommend noise abatement procedures, and assess complaints from an operational point of view.

6. Issuance of noise abatement procedures if needed.

7. Regional information and eduction programs.

8. Cooperation with local governing bodies and planning boards in order to achieve long term benefits from land use planning.

9. Review of FAA documents and environmental requirements for airport development.

10. Annual review of the programs.

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[1] Harris, Andrew S., "Noise Abatement at General Aviation Airports," Noise Control Engineering, March-April 1978.

[2] Harris, Andrew S., "Noise Problems of General Aviation Airports," INTER-NOISE 76, Washington, D.C., April 1976.

REMEDIAL MEASURES FOR DEALING WITH NOISE ASSOCIATED WITH GENERAL AVIATION ACTIVITY - A CASE STUDY

PRESENTED BY W. J. CRITCHFIELD, A.A.E.
TORRANCE, CALIFORNIA

TO THE CONFERENCE ON GENERAL AVIATION AIRPORT
NOISE AND LAND USE PLANNING

ATLANTA, GEORGIA
OCTOBER 4, 1979

GENERAL AVIATION AS A MODE OF TRANSPORTATION HAS COME OF AGE.

UNFORTUNATELY, THIS CONVENIENCE AND SOPHISTICATION HAS DEVELOPED ADDITIONAL PROBLEMS WHICH PLAGUE GENERAL AVIATION. MOST AIRPORTS WHICH MAKE GENERAL AVIATION A CONVENIENT AND EFFICIENT MODE OF TRANSPORTATION HAVE TWO THINGS IN COMMON. THEY ARE LOCATED IN A CROWDED URBAN AREA, AND THEY ARE HEAVILY USED.

TORRANCE MUNICIPAL AIRPORT IS NO EXCEPTION. IT IS LOCATED IN THE SOUTH BAY AREA OF LOS ANGELES COUNTY SERVING A POPULATION IN EXCESS OF 2 MILLION. IT IS ALSO ABOUT THE 12TH BUSIEST AIRPORT IN THE NATION.

THE AIRPORT WAS FIRST DEVELOPED AS A FLIGHT STRIP BY THE BUREAU OF PUBLIC ROADS IN THE LATE 1920'S. IT WAS TRANSFERRED TO THE U.S. CORPS OF ENGINEERS AND DEVELOPED AS A FIGHTER STRIP IN THE EARLY AND MIDDLE 40'S.

IT WAS ACQUIRED BY THE CITY OF TORRANCE IN 1948. AT THAT TIME THE AIRPORT WAS SURROUNDED BY AGRICULTURE, OIL FIELDS, AND SOME INDUSTRIAL USE. THE COMMUNITY, NOW THE CITY OF LOMITA, TO THE EAST, WAS MOSTLY AGRICULTURAL USE RESIDENTIAL LOTS.

THE AIRPORT AND ITS SURROUNDING COMMUNITY REMAINED IN THIS GENERAL LAND USE PATTERN FOR 10 YEARS.

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IN 1958 THE CITY OF TORRANCE TOOK ACTION TO DEVELOP THE AIRPORT TO MEET THE GROWING NEED FOR GENERAL AVIATION. OVER THE NEXT 5 YEARS THE CONTROL TOWER WAS CONSTRUCTED, THE SECOND RUNWAY WAS BUILT, TAXIWAYS, PARKING APRONS, LIGHTING, AND HANGARS WERE CONSTRUCTED.

CONCURRENTLY, HOUSING AND APARTMENTS WERE DEVELOPED AROUND THE AIRPORT.

THE OBJECTIONS TO AIRCRAFT NOISE AND CONFLICTING LAND USE PATTERNS FIRST BECAME EVIDENT IN 1965. THE CITY OF TORRANCE STARTED ITS FIRST REMEDIAL MEASURE AT THAT TIME.

THIS DEALT WITH LAND USE. THE AREA IMMEDIATELY WEST OF THE AIRPORT HAD BEEN PERMITTED TO DEVELOP WITH POOR QUALITY HOUSING FOR SINGLE FAMILY AND MULTIPLE FAMILY RESIDENTIAL USE.

MANY OF THE HOUSES WERE FREEWAY MOVE-INS DISPLACED BY FREEWAY RIGHT-OF-WAY ACQUISITION AND RELOCATED. IN ORDER TO PROTECT THE AIRPORT, THE CITY OF TORRANCE INITIATED A FEDERAL HOUSING AND URBAN DEVELOPMENT REDEVELOPMENT PROJECT TO CONVERT THE RESIDENTIAL LAND USE TO LIGHT INDUSTRIAL.

THE PROJECT AMOUNTED TO $7 MILLION ON 1/3 MATCHING GRANT, LOANS AND LOCAL FUNDING.

THE ORIGINAL PROJECT CONVERTED RESIDENTIAL USES IMPACTED BY AIRPORT OPERATIONS TO LIGHT INDUSTRIAL, OFFICE, AND COMMERCIAL USES WHICH ARE COMPATIBLE AND, IN FIVE INSTANCES, HAVE CREATED LIGHT INDUSTRIAL COMMERCIAL OFFICE USES WITH DIRECT ACCESS TO THE AIRPORT.

TODAY IT IS AN EXAMPLE OF EFFECTIVE REDEVELOPMENT.

ANOTHER PROJECT UNDER STATE GUIDELINES USING LOCAL FUNDS WILL TAKE PLACE IMMEDIATELY NORTH OF THE EXISTING MEADOW PARK REDEVELOPMENT PROJECT.

IN 1965 THE CITY TOOK OTHER LAND USE MEASURES WHICH CONTINUE TO BE UTILIZED.

THESE ARE THE ACQUISITION OF AVIGATION EASEMENTS WHICH REQUIRE HEIGHT LIMITS, GRANT THE RIGHT OF FLIGHT, AND, IN SOME INSTANCES, REQUIRE ACOUSTIC TREATMENT.

AVIGATION EASEMENTS ARE OBTAINED BOTH AS DEED RESTRICTIONS ON TRACTS FOR NEW DEVELOPMENTS AND AS A CONDITION OF LAND USE CHANGES OR MODIFICATIONS SUCH AS CONDITIONAL USE PERMITS, LOT SPLITS, AND OTHER LAND USE MODIFICATIONS.

ACOUSTIC CONSTRUCTION IS ALSO REQUIRED FOR NEW STRUCTURES HAVING CRITICAL USES IN THE COMMERCIAL INDUSTRIAL AREAS. THIS INCLUDES THE HOSPITAL AND MEDICAL FACILITIES WHICH REQUIRE LOW INTERIOR NOISE LEVELS.

AVIGATION EASEMENTS ARE OBTAINED JUST AS STREET, SIDEWALK, SEWER, AND OTHER EASEMENTS ARE OBTAINED FOR NEWLY DEVELOPING PROPERTY OR PROPERTY REQUESTING MODIFICATION OF EXISTING USES.

IN CONGESTED URBAN AREA LAND USE PLANNING, RE-USE, DEED RESTRICTIONS, AND AVIGATION EASEMENTS ARE LIMITED AS REMEDIAL MEASURES.

THERE STILL EXIST RESIDENTIAL USES WHICH ARE IMPACTED BY GENERAL AVIATION AIRCRAFT OPERATIONS.

IN 1970 AIRCRAFT NOISE, TOGETHER WITH CHANGING LAND USE, RAISED QUESTIONS IN THE MINDS OF THE CITY COUNCIL AND MEMBERS OF THE COMMUMITY.

A PROCESS WAS STARTED FOR REVIEWING THE GOALS FOR THE AIRPORT WHICH RESULTED IN DEVELOPMENT OF THE NEW AIRPORT MASTER PLAN AND THE NOISE ABATEMENT PROGRAM BEING USED TODAY.

BEFORE MAKING ADDITIONAL ADJUSTMENTS, IT IS ESSENTIAL TO PERFORM AN OBJECTIVE ANALYSIS AND EVALUATION OF THE ENVIRONMENT OF THE AIRPORT.

THIS INCLUDES NOT ONLY THE COMMUNITIES SURROUNDING THE AIRPORT, BUT THE AIRPORT ITSELF, ITS USE, TYPES AND CLASS OF AIRCRAFT, AND THE SPECTRUM OF EXPERIENCE OF THE AIRCRAFT OPERATORS.

YOU MUST IDENTIFY THE PROBLEMS AND THE PROBLEM AREAS. THE AVERAGE GENERAL AVIATION PILOT DOES NOT PERCEIVE HIS OPERATION INTO AND OUT OF THE AIRPORT AS A PROBLEM. THE PILOT GENERALLY HAS NO PERCEPTION OF THE NOISE IMPACT OF HIS AIRCRAFT OPERATIONS ON THE ENVIRONMENT ON THE GROUND.

IT'S AKIN TO TURNING A DRIVER LOOSE ON A PARKWAY OR A FREEWAY WITHOUT A SPEEDOMETER AND CAUTIONING HIM NOT TO EXCEED THE SPEED LIMIT.

NOISE IS THE PRIMARY PROBLEM. SAFETY MAY BE BROUGHT FORTH AS A PROBLEM, BUT GENERALLY IT IS SECONDARY AND IS USED TO SUPPORT RESISTANCE TO NOISE IMPACT.

THE MAGNITUDE OF THE NOISE MUST BE ANALYZED,

THE SOURCE, IN TERMS OF THE AIRCRAFT TYPE, ITS POWER PLANT, PROPELLER NOISE, EXHAUST NOISE;

TECHNIQUE - THE PILOT'S EXPERIENCE, HIS FAMILIARIZATION WITH THE AIRCRAFT, AND ITS CAPABILITY, THE LIMITATIONS OF ITS PERFORMANCE, AND ITS NOISE, AND WITH THE AIRPORT AREA.

ANOTHER ELEMENT OF THE NOISE PROBLEM IS FREQUENCY OF OCCURRENCE - THE VOLUME OF THE NOISE MAY BE LOW, BUT MANY AIRCRAFT MAY BE OPERATING IN A TRAINING MODE, AND THE FREQUENCY OF OCCURRENCE OF THE OPERATIONS MAY BE EVERY 45 SECONDS. THE NOISE MAY NOT BE LOUD, BUT IT IS STEADY OR RECURRENT.

THE THIRD ELEMENT IS TIME OF OCCURRENCE. YOU MUST ANALYZE THE TIME OF OCCURRENCE OF THE NOISE EVENTS IN TERMS OF THE COMMUNITY'S CYCLE - WHAT ARE PEOPLE DOING AT THE TIME OF YEAR, THE TIME OF WEEK, OR TIME OF DAY THAT THE NOISE FROM AIRCRAFT OPERATIONS WOULD ANNOY THEM OR CREATE PROBLEMS FOR THEM? TORRANCE, WITH THE AID OF A PORTABLE NOISE MONITOR AND LATER A SOPHISTICATED COMPUTERIZED SYSTEM WITH 11 MONITOR SITES, CONDUCTED A SERIES OF NOISE ANALYSES OF OPERATIONS PRIMARILY FROM RUNWAY 29R.

80% OF THE AIRPORT OPERATIONS OCCUR TO THE WEST; A SIGNIFICANT AMOUNT OCCUR ON RUNWAY 29R.

FROM THIS ANALYSIS WE DEVELOPED A CURVE WHICH IDENTIFIED THE BULK OF THE AIRCRAFT OPERATING AT TORRANCE MUNICIPAL AIRPORT.

WE DETERMINED THAT ABOVE 82 MAXIMUM AND 88 SINGLE EVENT NOISE EXPOSURE LEVEL, 5% OF THE AIRCRAFT FLEET WOULD BE AFFECTED.

THE CITY COUNCIL IN INITIATING ACTION TO CONTROL THE NOISE IN THE VICINITY OF THE AIRPORT SELECTED THESE AS THE UPPER LIMIT FOR DAYTIME OPERATION TOGETHER WITH 76 MAXIMUM AND 82 SINGLE EVENT AS THE NIGHTTIME LIMITS.

THESE LIMITS WERE SELECTED BASED ON AN ANALYSIS OF AIRCRAFT MIX AND THEIR IMPACT ON THE COMMUNITY. OUR SELECTION AND DECISION APPEAR TO HAVE BEEN JUSTIFIED IN VIEW OF THE COURT DECISION IN SANTA MONICA.

ONCE THE INFORMATION, IDENTIFICATION OF THE PROBLEM, AND POSSIBLE SOLUTIONS ARE ASSEMBLED, THE THIRD EFFORT AT REMEDIAL MEASURES MUST BE INITIATED.

THERE MUST BE AN EDUCATION PROGRAM FOR BOTH PILOT USERS AND THE COMMUNITY.

WHEN YOU TALK ABOUT EDUCATION, MOST PILOTS SAY "NO WAY", AND MOST COMMUNITY REPRESENTATIVES SAY "YOU'VE GOT TO BE KIDDING".

PILOTS RESENT THE IMPLICATION THAT THEY ARE LESS THAN COMPETENT IN THEIR TECHNICAL SKILL, AND THE COMMUNITY DOES NOT BELIEVE THAT THE PEOPLE THUNDERING OVERHEAD AND MAKING NOISE CAN EVER BE EDUCATED.

NONETHELESS, WE HAVE ATTEMPTED IT, AND WE HAVE BEEN REASONABLY SUCCESSFUL - A MONTHLY NEWSLETTER, PROVISIONS FOR OPERATIONAL EVALUATION OF AIRCRAFT TO DETERMINE NOISE LEVEL, AND, MOST IMPORTANT OF ALL, COMMUNICATIONS.

The monthly newsletter is sent to both pilots and the community who wish to receive it. In this newsletter we report on the current status of the Noise Abatement Program, new techniques for reducing noise impact, both from the source and flying technique, caution on time of occurrence, and frequency of occurrence.

With evaluations, the City has utilized the newly acquired and installed noise monitoring system to review aircraft performance and flight techniques, we can talk directly to the pilots through our own multi-comm frequency acquired from the FCC for noise abatement purposes.

A pilot can make 2 or 3 runs using different techniques and get instant answers on which technique is most effective in reducing noise from his aircraft operation.

The great majority of the pilots are cooperative and understanding in response to the education program. Pilots pride themselves in the professional execution of their skill.

The education program is also an excellent tool for communicating with the community what is being done, what is not being done, and why.

Education is voluntary and only goes so far.

The fourth element in remedial measures is enforcement. The City Council of Torrance, based on data gathered, analysis, and evaluation of the airport noise environment, adopted an ordinance and submitted it to the Federal Aviation Administration.

The City received approval of certain provisions in that ordinance, the limitation on time periods when touch and go training operations could be performed, and the institution of a departure curfew.

Enforcement of these provisions commenced in October, 1978. A series of citations were issued or complaints filed; the incidents of violation of these portions of the ordinance are now zero.

INITIALLY THE LOCAL FEDERAL AVIATION ADMINISTRATION MADE MINIMAL COOPERATIVE EFFORT IN THE CITY'S ENFORCEMENT OF TOUCH AND GO LIMITATIONS AND DEPARTURE CURFEWS. AFTER SOME DISCUSSION THE FEDERAL AVIATION ADMINISTRATION NOW ISSUES ADVISORIES FOR THE PURPOSE OF ASSISTING PILOTS WHO MAY BE UNAWARE OF THE LIMITATIONS. ADVISORIES SUCH AS "FOR NOISE ABATEMENT, REQUEST YOU MAKE A FULL STOP" IN RESPONSE TO A REQUEST FOR TOUCH AND GO DURING PROHIBITED HOURS.

THIS HAS BEEN MOST HELPFUL IN PREVENTING PILOTS FROM BEING CITED AND CALLED INTO COURT AND FINED.

OUR OBJECTIVE, AFTER ALL, IS TO REDUCE THE NOISE IMPACT, NOT TO COLLECT FINES OR CITE FOR MISDEMEANOR VIOLATIONS.

THE CITY OF TORRANCE PLANS TO EXPAND ITS ENFORCEMENT ACTIVITIES INTO THE MAXIMUM NOISE LEVEL PORTION OF THE ORDINANCE BASED ON THE DECISION IN THE SANTA MONICA CASE.

THIS WILL IMPACT THOSE PILOTS WHO HAVE SELECTED AN AIRCRAFT THAT CANNOT MEET THE NOISE STANDARDS AT TORRANCE OR THOSE PILOTS WHO DO NOT OR WILL NOT UTILIZE THE TESTED AND PROVEN TECHNIQUES FOR REDUCING NOISE FROM THEIR AIRCRAFT OPERATIONS.

AGAIN, THE PURPOSE IS NOT TO FINE AND NOT TO CITE, BUT TO REDUCE NOISE.

PILOTS AND AIRCRAFT OWNERS WHO MEET THE NOISE LIMITATIONS AT TORRANCE ARE BENEFITED BY THIS ENFORCEMENT. IT REDUCES THE AMOUNT OF OVERALL NOISE IMPACT AND REDUCES THE PRESSURE FOR ADDITIONAL LIMITATIONS ON THE AIRPORT AND ITS OPERATIONS THUS MAKING THIS MODE OF TRANSPORTATION AVAILABLE TO THE MAJORITY OF USERS.

THE FIFTH MOST IMPORTANT REMEDIAL MEASURE IS REPORT THE RESULTS. IN THE FOUR PREVIOUS STEPS, REPORTING THE STEPS AND THEIR RESULTS IS THE MOST IMPORTANT OUTGROWTH AND SUPPORT THAT CAN BE USED.

A FULL DISCLOSURE OF INFORMATION, GOOD OR BAD, ON THE RESULTS OF THE OVERALL NOISE ABATEMENT PROGRAM IS IMPORTANT IN OBTAINING

CREDIBILITY AND SUPPORT OF BOTH PILOTS AND COMMUNITY.

THE NEWSLETTER, PRESENTATIONS TO GROUPS, SERVICE CLUBS, AND ORGANIZATIONS OF THE NOISE ABATEMENT PROGRAM'S FUNCTIONS AND OBJECTIVES, INTERFACE WITH MEDIA TO KEEP THEM ADVISED AS TO THE PROGRESS - ALL ARE IMPORTANT TO A SUCCESSFUL PROGRAM.

THE FEDERAL AVIATION ADMINISTRATION'S AVIATION NOISE ABATEMENT POLICY, PUBLISHED IN NOVEMBER, 1976, FURNISHES A BASIC GUIDELINE FOR NOISE REDUCTION PROGRAMS. A REASONABLE PROGRAM, BASED ON PROPER ANALYSIS, EVALUATION, AND PREPARATION, CAN BE ASSURED OF A REASONABLE RESPONSE FROM THE FAA.

UNFORTUNATELY, THERE ARE SOME ELEMENTS IN ANY GIVEN PROGRAM THAT, FROM TIME TO TIME, RECEIVES A NEGATIVE RESPONSE FROM THE FEDERAL AVIATION ADMINISTRATION BASED ON NATIONAL POLICY.

THE FEDERAL AVIATION ADMINISTRATION'S STRICT ADHERANCE TO NATIONAL POLICY IN CERTAIN MATTERS IS UNRESPONSIVE AND NEGATIVE IN ITS IMPACT ON LOCAL COMMUNITIES, AGENCIES, AND AIRPORT PROPRIETORS WHO NEED ALL THE HELP THEY CAN GET TO MAINTAIN THE TERMINAL ELEMENT OF OUR AIR TRANSPORTATION SYSTEM.

THE SUCCESS OF REMEDIAL MEASURES BY THE CITY OF TORRANCE AND OTHER GENERAL AVIATION AIRPORT PROPRIETORS WOULD BE MUCH MORE PRODUCTIVE IF THE FEDERAL AVIATION ADMINISTRATION WAS MORE RESPONSIVE AT THE LOCAL LEVEL PERMITTING THE REGIONAL OFFICES MORE FLEXIBILITY WITH GENERAL AVIATION AIRPORTS, THEIR NEEDS AND REQUIREMENTS.

THIS WILL LEAD TO A POLICY WHICH CAN REFLECT POSITIVE NOISE ABATEMENT EFFORTS DESIGNED SPECIFICALLY FOR LOCAL GENERAL AVIATION.

IN SUMMARY, A CASE STUDY OF REMEDIAL MEASURES AT TORRANCE MUNICIPAL AIRPORT INCLUDES LAND USE CONTROLS BY REDEVELOPMENT AND

REUSE, DEED RESTRICTIONS, AVIGATION EASEMENTS, AND ACOUSTIC CONSTRUCTION REQUIREMENTS TO PROTECT THE AIRPORT AND THE COMMUNITY.

IT INCLUDES COMMITMENT OF RESOURCES TO A PROGRAM.

WITHOUT THIS COMMITMENT OF DOLLARS AND PEOPLE, ANY PROGRAM IS ONLY PAPER, ORDINANCES, LAWS, CODES, AND IT WILL BE A "PAPER TIGER".

THE PROGRAM INVOLVES ANALYSIS OF AND DEFINING THE PROBLEMS, MORE RESOURCES, DOLLARS, PEOPLE AND EQUIPMENT.

THE PROGRAM INVOLVES EDUCATION FOR THOSE WHO CAN DO SOMETHING ABOUT THE PROBLEM, THE PILOTS AND THE COMMUNITY, MORE DOLLARS AND RESOURCES.

THE PROGRAM INVOLVES ENFORCEMENT. SOME REQUIRE GREATER INCENTIVE THAN OTHERS TO TAKE POSITIVE STEPS TO DO SOMETHING ABOUT THE PROBLEM, MORE DOLLARS AND PEOPLE.

AND FINALLY, REPORTING THE RESULTS OF THE PROGRAM TO THE COMMUNITY AND PILOTS.

USE OF THE NEWSLETTER, PERIODIC REPORTS TO THE CITIZENS' ADVISORY COMMITTEE, AIRPORT COMMISSION, AND CITY COUNCIL KEEP THE PILOTS AND COMMUNITY INFORMED OF PROGRESS.

WITH THESE REMEDIAL MEASURES, TORRANCE HAS REDUCED THE AIRPORT NOISE CONTOURS, ACCOMODATED A SLIGHT INCREASE IN OPERATIONS, GAINED A SIGNIFICANT INCREASE IN REVENUES, AND WE HAVE NO MORE DEMONSTRATIONS AND PROTESTS IN FRONT OF CITY COUNCIL.

IT'S WORKED FOR TORRANCE.

WE THINK IT'S A MODEL PROGRM.

THANK YOU.

Conference on General Aviation Airport Noise and Land Use Planning

Graduate City Planning Program
College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332
(404) 894-2350

PREVENTIVE MEASURES:
WESTCHESTER COUNTY AIRPORT, NEW YORK

PETER ESCHWEILER
COMMISSIONER OF PLANNING
WESTCHESTER COUNTY AIRPORT, NEW YORK

OCTOBER 4, 1979

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Document A

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
COUNTY OF WESTCHESTER
AND
THE TOWN OF RYE, WESTCHESTER COUNTY, NEW YORK

This memorandum is between the County of Westchester, hereinafter called the County, and the Town of Rye, hereinafter called the Town.

The County and the Town recognize the advantages of close cooperation in the development of the Westchester County Airport Master Plan, and in particular, the land use planning element and the Airport Noise Control and Land Use Compatibility Study (ANCLUC). This cooperation will be mutually beneficial, and will combine the talents of both parties to provide the best and most enduring solutions to the planning and resource development problems in that portion of the Town adjacent to the airport. This memorandum of understanding has been signed by both parties to implement these joint efforts.

WHAT THE COUNTY WILL DO

The County will provide the Town with detailed descriptions of the technical work to be performed under the Airport Master Plan, the land use planning element, and the Airport Noise Control and Land Use Compatibility Study.

The County will provide the Town Board with County projections of land use, population, housing, street and highway improvements, and other information relating to such areas of the Town as the Town Board may deem appropriate including the entire unincorporated area of the Town if so requested by the Town Board.

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For the purposes of the land use planning element, the County and its consultants will accept the adopted Town Development Plan as a "given", unless and until the Town notifies the County Planning Department that it has changed that policy statement; the Town will provide the County Planning department with copies of all such changes.

The County will meet with the Town Board at mutually convenient times to identify, discuss and attempt to resolve any off-airport land use issues arising within the Town and relating to the airport and its operations.

The County will review, upon the request of the Town Board, any local plans or applications to the Town for approval of land use actions during the time frame of the Airport Master Plan preparation and comment to the Town on the effect of such plans or applications on the airport or the effect by the airport on that such development.

On mutually convenient dates, the County and its consultants will brief Town officials on the progress of the Airport Master Plan, and solicit comments and suggestions thereon.

The County will provide the Town with copies of all information reports and discussion papers prepared during the Airport Master Plan and the ANCLUC study for the Town's information and comment.

The County will provide the Town with a copy of the final Airport Master Plan and ANCLUC study.

WHAT THE TOWN WILL DO

The Town will cooperate with the County and its consultants on the Airport Master Plan and consult with them on matters of local development affecting or affected by the airport and its operations.

The Town will provide a copy, to the County, of appropriate and pertinent local data and plans for land use, housing, population, neighborhood analysis, utility plans and the like which describe or which may influence development in the vicinity of the airport.

At present the Town has a home-owner representation from the Town and nominated by it on the Airport Advisory Board, and on the Airport Master Plan Policy Liaison Board. The Town may also designate an additional person specifically to represent the Town Board on the Airport Policy Liaison Board and other master plan working committees during the master plan process. The County will give due notice of such meetings to that representative.

The Town will provide to the County a copy of the local zoning ordinance, land subdivision regulations and other regulations controlling development in the vicinity of the airport.

The Town will review County projections of land use and population and other data pertaining to its area and submit comments thereon to the County.

The Town will meet on mutually convenient dates with the County and its consultants on the Airport Master Plan for consultation and to present the Town's comments and suggestions.

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IT IS FURTHER AGREED

That the town shall have the right to participate in the master planning process as fully as though it were a co-sponsor but shall not bear any responsibilities of endorsement or approval that might otherwise limit a co-sponsor.

That the implementation of this agreement regarding the land use planning element of the Airport Master Plan and the ANCLUC study shall be coordinated and supervised by the County Commissioner of Planning and by the Town Supervisor or their desingated representatives.

That the services and data to be provided by each part to the other shall be from the then-available sources and data, and at no cost to the other party.

The County and the Town may agree to develop such additional data as may be deemed to be advisable and appropriate for the Airport Master Plan and the ANCLUC studies, but within the constraints of available time and budget.

The County of Westchester and not the Town will be responsible for the obligations under the FAA Master Plan Grant Agreement with the United State Government.

Town of Rye

By: ______________________
Supervisor

Date: February 22, 1979

As authorized by Resolution
of , 1979

County of Westchester

By: ______________________
Commissioner

Date: February 22, 1979

As authorized by the
Board of Acquisition and
Contract by Resolution
Dated October 27, 1977

Document B

MEMORANDUM OF AGREEMENT
BETWEEN
THE TOWN OF RYE
AND
THE COUNTY OF WESTCHESTER
REGARDING ECONOMIC DEVELOPMENT

The Town of Rye and the County of Westchester are participating in the Airport Master Plan study for the Westchester County Airport and its accompanying Airport Noise control and Land Use Compatibility study.

The Town of Rye is contiguous with the Westchester County Airport, and is unique in that there are in the approach areas to Runway 34 some 300 acres of developable land in the Town of Rye. The appropriate development of this land is of particular concern both to the Town of Rye and to the County of Westchester, both because of its relationship to the County airport and in view of its economic benefits. As a part of the master plan and ANCLUC studies, the Town and the County are cooperating in the study of the appropriate form and type of development for this specific area.

The Town of Rye has designated this area as a critical area on which it wishes to cooperate with the County in promoting sound economic development for the highest and best possible use in our existing circumstances. Accordingly, it is hereby agreed that the County of Westchester and the Town of Rye will continue the cooperation started under the Airport Master Plan and ANCLUC studies and will

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actively seek the appropriate development of this land by such developers and with such land uses as will be of great value to the Town of Rye and yet be compatible with the requirements relating to public safety and welfare for the use of land in the vicinity of the County Airport. Both the County and the Town agree that a necessary and immediate priority of this joint economic development effort will be the planning of an effective and appropriate access road system, linking route 684 with the developable land in the Town of Rye, designed to improve the value and viability for the land for prudent economic development.

In support of this agreement, the Town pledges to pursue in good faith its responsibilities in the preparation of the Airport Master Plan and ANCLUC study agreement, and to cooperate with the County in seeking and supporting appropriate development options. The County of Westchester pledges the staff support of the County personnel, particularly those of the Office of Economic Development, the Department of Planning, the Department of Public Works, and the Department of Transportation, in obtaining and promoting the appropriate development of this critical area of the Town of Rye.

Signed this 22nd day of February 1979 by

Anthony J. Posillipo
Supervisor
Town of Rye

Alfred B. DelBello
County Executive
County of Westchester

General Aviation
Manufacturers Association

Suite 517
1025 Connecticut Ave., N.W.
Washington, D. C. 20036
(202) 296-8848

THE ROLE OF AIRCRAFT MANUFACTURERS IN ALLEVIATING GENERAL AVIATION NOISE

- STANLEY J. GREEN -
VICE PRESIDENT
GENERAL AVIATION MANUFACTURERS ASSOCIATION

CONFERENCE ON GENERAL AVIATION AIRPORT NOISE
AND LAND USE PLANNING

GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA

OCTOBER 3 - 5, 1979

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FIRST, LET ME TELL YOU WHAT GENERAL AVIATION IS TO GAMA. GENERAL AVIATION, WHICH IS DEFINED AS ALL CIVIL AVIATION OTHER THAN THE LARGE SCHEDULED AIR CARRIERS, IS VITAL TO THE NATION'S ECONOMY AND TOUCHES EVERY SEGMENT OF AMERICAN LIFE IN SOME BENEFICIAL WAY.

GENERAL AVIATION MAY ALSO BE DESCRIBED AS OVER 800,000 PILOTS FLYING 200,000 AIRCRAFT TO AND FROM OVER 14,000 AIRPORTS. IT COMPLEMENTS THE EXCELLENT AIRLINE SYSTEM OF THE U.S. BY TRANSPORTING OVER 110,000,000 INTERCITY PASSENGERS ANNUALLY. ALTHOUGH MOST OF THESE FLIGHTS USE AIRPORTS WITHOUT AIRLINE SERVICE AT ONE, OR OFTEN BOTH ENDS OF THEIR FLIGHTS, ONE-THIRD OF ALL BUSINESS FLIGHTS INTO MAJOR METROPOLITAN AIRPORTS CONNECT WITH A SCHEDULED AIRLINE FLIGHT.

IN SHORT, GENERAL AVIATION - WHICH INCLUDES COMMUTER AIRLINES, AIR TAXIS, AND BUSINESS AND PERSONAL AIRCRAFT - EXPANDS THE BENEFITS OF AIR TRANSPORTATION FROM THE 380 SOME AIRPORTS SERVED BY THE SCHEDULED AIRLINES TO THE NEARLY L8,000 COMMUNITIES SERVED BY GENERAL AVIATION. MANY OF THESE AIRPORTS ARE IN RURAL AREAS OF THE COUNTRY AND GENERAL AVIATION IS THE ONLY FORM OF AIR TRANSPORTATION.

GENERAL AVIATION IS AN INDUSTRY THAT EMPLOYS OVER 300,000 PEOPLE IN MANUFACTURING, SALES, FLIGHT DEPARTMENTS, MAINTENANCE AND OTHER RELATED SERVICES. THERE ARE OVER 5,000 LOCAL AND INDEPENDENT BUSINESSES INVOLVED IN GENERAL AVIATION, NATIONWIDE.

General aviation also contributes significantly to the U.S. balance of trade. Historically, one-fourth of the total general aviation production is exported, with the result that nearly 90 percent of the world's general aviation fleet has been manufactured in the United States.

Growth of General Aviation

Since the beginning of 1970, considerable growth has occurred in the general aviation industry.

- The general aviation fleet has grown 60 percent, from 130,000 aircraft to 200,000
- The number of hours flown has increased 56 percent, from 25 million to 39 million hours annually.
- The number of corporations using business airplanes among the Forture 1000 has grown to 524, an increase over 25 percent. Additionally, thousands of small businesses have purchased their own aircraft.
- In 1970, the industry delivered 7,300 aircraft. This figure was surpassed in the first five months of 1979.

Last year, almost 18,000 new aircraft valued at $1.78 billion, were delivered by the U.S. manufacturers. This year, our manufacturers expect to deliver approximately the same number of new aircraft with a shipment value exceeding $2.1 billion. The sophistication of these aircraft is also increasing. A larger percentage of the fleet is being delivered with increased instrument flying capabilities and practically all new aircraft are equipped with transponders.

THERE IS AN INCREASING TREND TOWARD PRESSURIZATION. TWENTY PERCENT OF NEW SINGLE ENGINE AIRCRAFT ARE NOW TURBOCHARGED, WHICH PROVIDES BETTER FUEL EFFICIENCY AND HIGHER SPEEDS AT HIGHER ALTITUDES. IN ADDITION, THE NUMBERS OF HIGHER PERFORMANCE AIRCRAFT ARE INCREASING AS A PERCENTAGE OF THE TOTAL FLEET. SO FAR THIS YEAR, SHIPMENTS OF MULTIENGINE PISTON AND TURBOPROP AIRCRAFT ARE UP BY 20 PERCENT, AND JETS BY 25 PERCENT.

IN THE NEXT 10 YEARS, FAA IS FORECASTING THAT THE GENERAL AVIATION FLEET WILL INCREASE AN ADDITIONAL 55 PERCENT, TO OVER 300 THOUSAND AIRCRAFT. IT IS ANTICIPATED THAT THERE WILL BE OVER A MILLION ACTIVE PILOTS. FLYING HOURS ARE ANTICIPATED TO INCREASE BY 58 PERCENT.

THE AIRLINE DEREGULATION ACT OF 1978 HAS PROVEN TO BE OF CONSIDERABLE BENEFIT TO THE GENERAL AVIATION MANUFACTURERS. THE GROWTH OF THE COMMUTER AIRLINE INDUSTRY, ENCOURAGED BY THE NEW LAW, IS PLACING UNPRECEDENTED DEMANDS FOR NEW AIRCRAFT. IN ADDITION, MORE AND MORE BUSINESSES ARE FINDING THAT THEIR OWN AIRCRAFT ARE INDISPENSABLE "BUSINESS TOOLS" TO TRAVEL TO LOCATIONS WHICH ARE OFTEN DIFFICULT TO REACH BY THE SCHEDULED AIRLINES. IN THE PAST 10 YEARS, 120 POINTS OF SERVICE HAVE BEEN DROPPED BY THE CERTIFICATED AIRLINES, MANY OF WHICH HAD NO REPLACING SERVICE. THE CAB CURRENTLY HAS ON FILE NOTICES FROM CERTIFICATED AIRLINES REQUESTING TO DISCONTINUE SERVICE TO 130 ADDITIONAL POINTS.

CONSEQUENTLY, BUSINESS AVIATION AND THE SCHEDULED AIRLINES FORM AN IMPORTANT INTERCONNECTING LINK, AS GENERAL AVIATION PROVIDES SERVICE TO ALL OF THESE POINTS.

ON JULY 21, 1968, SECTION 611, CONTROL AND ABATEMENT OF AIRCRAFT NOISE AND SONIC BOOM, BECAME PART OF THE FAA ACT OF 1958 AND SET IN MOTION A MAJOR REGULATORY BASED EFFORT TO CONTROL AIRCRAFT NOISE AT ITS SOURCE. THIS EFFORT HAS INTENSIFIED OVER THE YEARS THROUGH FURTHER AMENDMENTS TO THE ACT AND THROUGH CONTINUING REGULATORY PRESSURES.

THE PURPOSE OF THIS, OF COURSE, IS TO PROTECT THE ENVIRONMENT - THAT "COMPLEX OF SOCIAL AND CULTURAL CONDITIONS AFFECTING THE NATURE OF AN INDIVIDUAL OR SOCIETY."

THERE ARE A LOT OF CONCERNS WITHIN THE GENERAL AVIATION COMMUNITY THAT CAN BE TERMED "ENVIRONMENTAL." OBVIOUSLY, WE NEED AIRPORTS AT EACH END OF EACH SUCCESSFUL TRIP, AND AIRPORTS ARE GETTING HARDER TO COME BY, AND TO KEEP. ISSUES THAT WERE ONCE THOUGHT TO HAVE BEEN FINALLY SETTLED ARE REOPENED AS PROGRAMS TO REPAVE OR INCREASE THE LENGTH OF RUNWAYS LEAD TO COMMUNITY HEARINGS ON THE ENVIRONMENTAL EFFECTS OF THESE PROGRAMS. CONCERNS THAT WERE ONCE WHOLLY THE BALIWICK OF THE CIVIL ENGINEER NOW RECEIVE ATTENTION BY AIRCRAFT MANUFACTURERS, PILOT ORGANIZATIONS, AND FIXED BASED OPERATORS. RUNOFF, SEWERAGE, EMISSIONS, AND NOISE -- ALL ARE PART OF THE ENVIRONMENTAL CONCERN OF THE AIRPORT. AS MANUFACTURERS, WE MUST BE KNOWLEDGEABLE OF THE EFFECTS (AND WORK TO MINIMIZE THE IMPACT) ON THE COMMUNITY IF THE EXPANSION OF OUR BUSINESS, WHICH OBVIOUSLY WE DESIRE, IS TO TAKE PLACE.

MORE SIMPLY SAID, NOISE IS AN IMPEDIMENT TO THE CONTINUED GROWTH OF GENERAL AVIATION, AND WE MUST, AND ARE, WORKING TO REDUCE THIS IMPEDIMENT.

LET'S SPEND A FEW MINUTES AND REVIEW WHERE WE WERE SO AS TO BETTER PUT IN PERSPECTIVE WHERE WE ARE. IN NOVEMBER OF 1969, THE FAA PUBLISHED FAR PART 36, A SET OF RULES ESTABLISHING NOISE LIMITS APPLICABLE TO NEW JET AIRCRAFT DESIGNS. ITS OBJECTIVE WAS SIMPLE - PUT A CAP ON AIRCRAFT NOISE, WHICH WAS CLEARLY ESCALLATING AS MORE AND MORE JET AIRCRAFT ENTERED THE FLEET AND OPERATIONS INCREASED. IN 1975, WITH RESPECT TO THE GENERAL AVIATION JETS, THESE SAME STANDARDS WERE APPLIED TO NEWLY MANUFACTURED AIRCRAFT OF THE OLDER TYPE DESIGNS.

TO QUANTIFY THESE REGULATIONS, FOR THE GENERAL AVIATION JETS, THOSE WHOSE MAXIMUM TAKEOFF GROSS WEIGHT ARE 75,000 POUNDS OR LESS, WE SAW LIMITS ON NOISE AS FOLLOWS:

1. FOR THE APPROACH AND SIDELINE SITUATIONS, 102 EPNDB.
2. FOR THE TAKEOFF SITUATION, 93 EPNDB.

A NUMBER OF AIRCRAFT DESIGNED IN THE 1960'S, AND WHICH WERE STILL IN PRODUCTION, DID NOT MEET THESE LEVELS AND EITHER HAD TO BE MODIFIED OR GO OUT OF PRODUCTION. THE MANUFACTURERS EFFECTIVELY

MET THE REQUIREMENTS THROUGH A VARIETY OF WAYS - "HUSH KITS," SPECIAL, REQUIRED OPERATING TECHNIQUES AND RE-ENGINING, WITH THE RE-ENGINING USUALLY ACCOMPANIED BY OTHER MODIFICATIONS TO THE AIRCRAFT TO IMPROVE PERFORMANCE. THE ENGINES USED BY THE AIRCRAFT COMPANIES WHO CHOSE THE RE-ENGINING ROUTE WERE CERTIFIED IN THE 1971 - 72 TIMEFRAME, THE GARRETT CORPORATION TFE 731 AND THE PRATT AND WHITNEY JT 15D. THE RESULTS OF RE-ENGINING WERE DRAMATIC - SUBSTANTIAL REDUCTIONS IN NOISE LEVELS WERE ACHIEVED ALONG WITH MANY OTHER BENEFITS, PRIMARILY REDUCED FUEL CONSUMPTION.

THESE ENGINES WERE ALSO UTILIZED IN NEW AIRCRAFT DESIGNS - DESIGNS THAT HAD SUBSTANTIAL MARGINS BETWEEN THE REGULATORY ALLOWABLE NOISE LEVELS AND THOSE ACTUALLY MEASURED. THE MARGINS WERE OF COURSE "DESIGNED IN" TO ALLOW FOR FUTURE GROWTH OF BOTH THE ENGINE AND THE AIRCRAFT - THE ENGINE'S GROWTH POTENTIAL FOR THE PURPOSE OF EXPANDING ITS POTENTIAL AIRFRAME APPLICATIONS - THE AIRCRAFT GROWTH - TO EXPAND ITS APPLICATIONS.

THE REGULATORY TREND IS ALWAYS TOWARD TOUGHER REQUIREMENTS - IN THIS CASE LOWER NOISE - AND TOUGHER STANDARDS WERE INEVITABLE. FAA'S LATEST RULES, RESULTING FROM A NOTICE OF PROPOSED RULEMAKING PUBLISHED IN 1976, SUBSTANTIALLY TIGHTENED THE STANDARDS FOR NEW DESIGNS OF AIRCRAFT. THESE STANDARDS WERE ORIGINALLY DEVELOPED BY THE INTERNATIONAL CIVIL AVIATION ORGANIZATION COMMITTEE ON AIRCRAFT NOISE AT ITS FIFTH MEETING AND ARE SOMETIMES REFERRED TO AS CAN 5 NOISE LEVELS.

AGAIN, TO QUANTIFY THESE NEW REGULATIONS, FOR GENERAL AVIATION JETS, THE APPROACH LIMIT DROPS FROM 102 EPNdB TO 98; THE SIDE LINE, FROM 102 TO 94, AND THE TAKEOFF, FROM 93 TO 89.

NOW LETS TAKE A LOOK AT THE FIRST VIEWGRAPH - TAKEOFF NOISE LEVELS. THE TOP SOLID LINE, LABELLED 69 FAR 36, IS THE FAA ORIGINAL 1969 REGULATION. THE TRIANGLES SHOW THE NOISE LEVEL OF MANY OF THE ORIGINAL GENERAL AVIATION JETS, THE LEAR 23, 24, 25 SERIES, THE ROCKWELL SABERLINER SERIES, THE LOCKHEED JET STAR, AND THE GRUMMAN GULFSTREAM II. AS I MENTIONED, WHEN AIRCRAFT THAT WERE STILL IN PRODUCTION WERE REQUIRED TO MEET THE 1969 RULES, WE DID SO THROUGH EITHER THE USE OF SUPPRESSORS OR REQUIRED OPERATING TECHNIQUES, SUCH AS CUT-BACK. THESE AIRCRAFT ARE INDICATED BY THE HEXAGONS. SOME AIRCRAFT WERE MODIFIED BY RE-ENGINING WITH MODERN TURBO FANS. THESE AIRCRAFT ARE SHOWN AS SQUARES. IF THE SYMBOL, TRIANGLE, HEXAGON, OR SQUARE, IS FILLED IN, IT MEANS THAT CUT-BACK AFTER TAKEOFF IS USED AS A STANDARD OPERATING TECHNIQUE TO ACHIEVE THE MEASURED NOISE LEVEL.

THE RESULTS OF RE-ENGINING ARE OFTEN TIMES DRAMATIC. NOTE THE OPEN TRIANGLE AT THE 106 dB LEVEL. THE OPEN SQUARE JUST BELOW THE 93 dB LEVEL IS THE SAME AIRCRAFT, A REDUCTION OF 13 EPNdB.

AS IS VERY EVIDENT, OUR MODERN TURBO-FAN-POWERED GENERAL AVIATION AIRCRAFT, SHOWN BY THE CIRCLES, ARE, IN MOST CASES, SUBSTANTIALLY BELOW THE 1978 LIMIT. THIS SIMPLY MEANS THAT WE HAVE CONSIDERED NOISE AS A PRIME DESIGN PARAMETER IN THE DESIGN AND MANUFACTURE OF THESE AIRCRAFT.

TURNING NOW TO CHART NUMBER TWO, WHICH SHOWS THE APPROACH NOISE LEVELS, AGAIN WE SEE THE ORIGINAL FAA REGULATION, 69 FAR 36, AND THE PRESENT REGULATION, 78 FAR 36.

NEW ENGINE DESIGNS SCHEDULED FOR CERTIFICATION IN THE NEXT FEW YEARS, ARE, IN ADDITION TO BEING MORE ECONOMICAL THAN TODAY'S DESIGNS, ALSO GOING TO BE QUIETER. THUS, THE NEWEST AIRCRAFT DESIGNS ARE BEING TARGETED TO BE WELL BELOW PRESENT FAA NOISE LIMITS. THE MOST SIGNIFICANT NEW TYPES WILL BE THE PART 24 COMMUTER AIRCRAFT, SCHEDULED FOR INTRODUCTION ABOUT 1983-85.

RECOGNIZING, HOWEVER, THAT WITHOUT SOME LIMITS, NOISE LEVELS WOULD LIKELY CREEP UP, THE INTERNATIONAL CIVIL AVIATION ORGANIZATION ADOPTED, IN APRIL OF 1974, A RECOMMENDED PRACTICE ESTABLISHING SUCH LIMITS. FAA ADOPTED THESE LIMITS IN JANUARY OF 1975, TO BECOME OPERATIVE ON JANUARY 1ST, 1980. THIS MEANS THAT AFTER THE END OF THIS YEAR, NO PROPELLER DRIVEN GENERAL AVIATION AIRCRAFT MAY RECEIVE AN ORIGINAL AIRWORTHINESS CERTIFICATE UNLESS IT MEETS THE STANDARD.

THE EFFECT OF OUR INDUSTRY WAS PREDICTABLE AND THE RESULTS HAVE BEEN DRAMATIC. WHEN WORK WAS STARTED BY ICAO ON THE DEVELOPMENT OF ITS RECOMMENDED PRACTICE, IN 1972, A MAJOR PORTION OF THE FLEET THEN BEING CURRENTLY PRODUCED DID NOT MEET THE LEVELS BEING DISCUSSED AS POSSIBLE LIMITS - AND THE WORK BEGAN. CERTIFICATION AND RECERTIFICATION OF AIRCRAFT IS COSTLY AND TIME CONSUMING. IT WOULD NOT BE POSSIBLE TO WAIT UNTIL JUST BEFORE THE REGULATORY CUT-OFF TO RECERTIFICATE ALL OF THE AIRCRAFT, MUCH LESS MODIFY THOSE THAT COULD NOT MEET THE LIMITS.

BY THE END OF 1976, FULLY THREE YEARS AHEAD OF THE REGULATION DATE, ALMOST ALL NEWLY MANUFACTURED AIRCRAFT BELOW 6,000 POUNDS TAKEOOF GROSS WEIGHT HAD BEEN MODIFIED TO **BRING** THEM INTO COMPLIANCE. CERTIFICATION OF ALL AIRCRAFT, INCLUDING THOSE IN THE 6,000 TO 12,500 POUND CATEGORY, IS VIRTUALLY COMPLETE.

IT APPEARS THAT WE HAD TO TAKE A DIFFERENT TACK IF WE ARE TO FURTHER REDUCE PROPELLER DRIVEN AIRCRAFT NOISE STANDARDS. FROM THE HARDWARE POINT OF VIEW, WE ARE ATTACKING THE NOISE PROBLEM BY TECHNOLOGY DEVELOPMENT - STUDYING, PRIMARILY, NEW PROPELLER DESIGNS. THIS EFFORT, HOWEVER, WILL NOT PRODUCE FRUITFUL RESULTS FOR AT LEAST FIVE TO TEN YEARS.

MORE IMMEDIATE RESULTS IN NOISE REDUCTION WILL COME ABOUT THROUGH CHANGES IN THE OPERATING PROCEDURES FOR THE AIRCRAFT. WE ARE ACCOMPLISHING THIS GOAL THROUGH GAMA SPECIFICATION NO. 1.

FOR THOSE WHO ARE NOT FAMILIAR WITH OUR GAMA SPECIFICATION NO. 1, "SPECIFICATION FOR PILOT'S OPERATING HANDBOOK," IT WAS INTRODUCED BY GAMA ON FEBRUARY 15, 1975, AS A GUIDE TO INDUSTRY STANDARDIZATION OF MATERIAL WHICH WOULD BE OF MAXIMUM USEFULNESS AS AN OPERATING REFERENCE HANDBOOK BY PILOTS AND MEET APPLICABLE GOVERNMENT REGULATORY REQUIREMENTS TO SUPPLY WITH EACH AIRCRAFT, AN FAA APPROVED AIRPLANE FLIGHT MANUAL. THE MAJOR FEATURE OF THE SPECIFICATION WAS TO INCREASE THE IN-FLIGHT USEFULNESS OF THE BOOK BY STANDARDIZING THE FORMAT OF HANDBOOKS, USING UNITS THAT ARE OF MOST VALUE TO PILOTS, AND INTEGRATING THE MATERIAL REQUIRED BY REGULATION WITH ADDITIONAL INFORMATION PROVIDED BY THE MANUFACTURER.

THE SPECIFICATION HAS BEEN USED SUCCESSFULLY BY GAMA MANUFACTURERS SINCE THAT TIME AND THE CONCEPT HAS BEEN PROVEN.

WE ARE NOW IN THE PROCESS OF REVISING THE SPECIFICATION TO ACCOUNT FOR OTHER THAN PURE OPERATIONAL CONSIDERATIONS - FUEL ECONOMY AND NOISE REDUCTION.

IN ACCORDANCE WITH FAA REGULATIONS THE ORIGINAL SPECIFICATION PROVIDED A "MAXIMUM CONTINUOUS POWER LIMITATION," THE HIGHER POWER THAT THE ENGINE HAS BEEN DEMONSTRATED TO DELIVER, IN THE PARTICULAR AIRPLANE, WITHOUT TIME LIMIT ON ITS USE. HOWEVER, AIRPLANE PERFORMANCE DOES NOT REQUIRE THE USE OF MAXIMUM CONTINUOUS POWER FOR NORMAL OPERATIONS OTHER THAN TAKEOFF, AND CONTINUOUS USE OF THIS POWER HAS ADVERSE EFFECTS ON NOISE, FUEL ECONOMY AND ENGINE WEAR. WE HAVE, THEREFORE, ESTABLISHED A LIMITATION OF THE USE OF MAXIMUM CONTINUOUS POWER BY DEFINING IT

AS THE "MAXIMUM POWER PERMISSIBLE CONTINUOUSLY DURING TAKEOFF, ONE ENGINE INOPERATIVE, ABNORMAL AND EMERGENCY OPERATIONS ONLY."

THE MAXIMUM POWER PERMISSIBLE CONTINOUSLY DURING ALL NORMAL OPERATIONS IS CALLED MAXIMUM NORMAL OPERATING POWER. THIS POWER MAY NOT BE EXCEEDED FOR ALL NORMAL CLIMB AND CRUISE CONDITIONS, AND WOULD RESULT IN A LOWER NOISE LEVEL, TYPICALLY 4 TO 9 dB LESS THAN THAT WHICH THE SAME AIRPLANE WOULD MAKE AT MAXIMUM CONTINUOUS POWER. ALL PERFORMANCE INFORMATION CONTAINTED IN THE PILOT'S OPERATING HANDBOOKS WILL BE BASED ON THE NEW POWER LIMITATIONS. SELECTION OF MNOP IS A JUDGEMENT FACTOR, VARYING AS A PERCENTAGE OF MAXIMUM CONTINUOUS POWER, IN DIFFERENT AIRPLANES. CLIMB AND HANDLING CHARACTERISTICS OF EACH AIRPLANE MUST BE CONSIDERED TO DETERMINE THE BEST SITUATION - LOUDER BUT HIGHER FASTER, AND THUS QUIETER, OR NOT AS LOUD BUT HIGHER SLOWER.

THE IDEA OF PROVIDING PERFORMANCE INFORMATION CONTAINING A NOISE REDUCTION ELEMENT IS BEING EXPLORED IN GREATER DEPTH FOR APPLICABILITY TO OUR JET AIRCRAFT. THIS EFFORT, CONCEPTIONALLY SIMILAR TO REDUCED POWER TAKEOFF INFORMATION TO IMPROVE ENGINE ECONOMIES, WOULD PROVIDE A PILOT WITH THE NECESSARY OPERATING INFORMATION TO KEEP THE NOISE LEVEL OF THE AIRCRAFT AT A MINIMUM.

IT WOULD ALSO BE USED TO DETERMINE THE EXPECTED NOISE LEVEL OF THE AIRCRAFT UNDER CERTAIN OPERATING CONDITIONS SUCH AS A LOCAL WEIGHT, TEMPERATURE AND HUMIDITY.

WITHOUT GOING INTO THE DETAILS OF PROP SIZING AND BLADING, ENGINE DERATING AND OTHER CERTIFICATION ACTIVITIES, THIS COVERS WHAT THE MANUFACTURERS HAVE DONE TO REDUCE THE NOISE OF THEIR AIRCRAFT. CONTINUING RESEARCH AT A REASONABLE PACE AND COST WILL CONTINUE, THOUGH IT IS BELIEVED FURTHER REDUCTIONS IN NOISE WILL COME IN SMALL INCREMENTS NOT OF THE BREAK THROUGH VARIETY BROUGHT ABOUT BY THE FAN ENGINE OVER THE STRAIGHT JET.

HOWEVER, THIS DOES NOT COMPLETELY COVER OUR ROLE IN THE NOISE ISSUE. WE WILL CONTINUE TO SUPPORT REASONABLE RULE MAKING EFFORTS, BOTH IN THE U.S. AND ABROAD. REMEMBER, WE EXPORT ABOUT 25% OF THE AIRCRAFT WE MANUFACTURE. IN FACT, FOR JET AIRCRAFT ONLY, WE EXPORT ABOUT ONE-THIRD OF THE TOTAL MANUFACTURED. FOR THIS REASON, WE ACTIVELY FOLLOW ICAO ACTIVITIES AND ADVOCATE KEEPING THE U.S. REGULATIONS IN LINE WITH THOSE OF OTHER COUNTRIES AND VICE VERSA. CERTIFICATION COSTS ARE TOO HIGH TO HAVE TO REPEAT TESTS IN EACH COUNTRY IN WHICH WE SELL AIRCRAFT.

BUT MOST IMPORTANTLY, WE NEED UNIFORM AIRPORT NOISE REGULATIONS - UNIFORM THROUGHOUT THE UNITED STATES - APPLICABLE TO ALL AIRPORTS, PARTICULARLY AIRPORTS THAT RECEIVED FEDERAL FUNDS. THIS DOES NOT NECESSARILY MEAN THE SAME REGULATIONS FOR EACH AIRPORT. BUT, THE NOISE LEVELS ESTABLISHED AT AIRPORTS MUST BE BASED ON THE SAME CRITERIA. MUST BE CALCULATABLE BY THE SAME METHODOLOGY AND MUST BE SURE AND CERTAIN BEFORE A PILOT SETS FORTH ON A TRIP. THE NOISE LEVELS CHOSEN MUST BE REASONABLE AND MUST RELATE TO THE LOCAL CONDITIONS. THEY MUST NOT BE CHOSEN TO CATER TO THE

IDIOSYNCRASIES OF A FEW AIRPORT NEIGHBORS WHO BELIEVE THAT THEIR AUTOS, TRUCKS AND LAWNMOWERS HAVE A RIGHT TO MAKE MORE NOISE THAN AIRPLANES.

WE ALSO STRIVE TO KEEP THE REGULATIONS REASONABLE AND TO KEEP THE BALANCE BETWEEN WHAT THE COMMUNITY MUST DO AND MUST ACCEPT AS THE PRICE FOR ITS AIRPORT AND ENTRY INTO THE NATION'S AIR TRANSPORTATION SYSTEM.

GENERAL AVIATION JET AIRCRAFT ARE 10 TO 15 EPNDB - OR MORE - LOWER THAN THE NEW, LARGE, WIDE-BODY COMMERCIAL TRANSPORTS. THE FREQUENCY OF OCCURRENCES - TAKEOFFS AND APPROACHES - FOR GENERAL AVIATION BUSINESS JETS, IS ALSO MARKETEDLY LOWER THAN FOR THE LARGE COMMERCIAL TRANSPORTS. AVERAGE YEARLY UTILIZATION OF A BUSINESS JET IS APPROXIMATELY 600 HOURS COMPARED WITH ABOUT 3,000 HOURS FOR THE AIRLINE JET. THERE ARE, ON AN AVERAGE, ABOUT 10 GENERAL AIVATION JET OPERATIONS, TAKEOFFS AND LANDINGS, PER DAY, AT THE MAJOR AIR CARRIER AIRPORTS. IF A GENERAL AVIATION FLEET MEETING THE PRESENT FAA STANDARD (AND THE MAJORITY OF POST 1975 MANUFACTURED AIRCRAFT DO MEET THIS STANDARD) WERE OPERATED INTO THE LARGE AIR CARRIER AIRPORTS, WE WOULD NOT ADVERSELY AFFECT THE NOISE LEVELS GENERATED BY AIR CARRIER TRAFFIC AT THESE AIRPORTS, EVEN IF THAT TRAFFIC MET THE EPA NOISE GOALS.

REASONABLE OBJECTIVE FOR AIRPORT NEIGHBORHOOD COMMUNITIES, "BECAUSE PRESENT LIMITED DATA INDICATE THAT, AT SOME AIRPORT, AN LDN CONTRIBUTION

OF NOISE FROM AIRCRAFT OF LESS THAN 65 DB IS DIFFICULT TO DISTINGUISH FROM OTHER AMBIENT NOISE, GIVEN THE ENVIRONMENTAL NOISE LEVEL (OTHER THAN FROM AIRCRAFT) AROUND THOSE AIRPORTS."

GAMA CALCULATED THE EFFECT OF THE COMMUNITY NOISE EXPOSURE LEVELS EXPECTED FROM A FLEET OF GENERAL AVIATION PROPELLER-DRIVEN AIRCRAFT, MEETING THE FAA STANDARDS. USING A STATISTICALLY COMPUTED MIX OF AIRCRAFT, WE COMPUTED THE L_{DN}'S AT A POINT 3500 METERS FROM THE BEGINNING OF THE TAKE-OFF ROLL, AT A SELECTED 2833 AIRPORTS AT WHICH, AN FAA STUDY SHOWS, 95% OF GENERAL AVIATION OPERATIONS OCCUR. WE SEPARATELY CALCULATED THE L_{DN} FOR SANTA ANA AIRPORT WHICH HAS ABOUT 100 GENERAL AVIATION OPERATIONS PER HOUR. AT THIS AIRPORT, THE CALCULATED L_{DN} WAS 64. SANTA ANA'S CALCULATED VALUE WAS COMPARED WITH ITS MEASURED VALUE OF 68 FROM ALL NOISE SOURCES, INCLUDING AIR CARRIER AIRCRAFT.

BASED ON THESE TWO VALUES, WE CALCULATED THAT IF ALL PROPELLER DRIVEN AIRCRAFT WERE BANNED FROM SANTA ANA, THE MEASURED VALUE WOULD GO DOWN ABOUT 1 DB. THE EFFECT AT OTHER AIRPORTS, WITH SIGNIFICANTLY FEWER PROPELLER DRIVEN SMALL AIRPLANE OPERATIONS, WOULD EVEN BE LESS.

MODIFICATION OF EXISTING AIRCRAFT TO INCORPORATE NOISE REDUCING DEVICES IS EXTREMELY EXPENSIVE. THE PRIMARY NOISE SOURCE IS THE PROPELLER. TO DEVELOP A NEW QUIETER PROPELLER FOR AN AIRCRAFT REQUIRES MUCH ENGINEERING EVALUATION, TIME CONSUMING ENGINE PROPELLER

VIBRATION STUDIES, AND COMPLETE AIRCRAFT PERFORMANCE EVALUATION. THE COST OF THIS WORK IS UPWARDS OF ONE HALF MILLION DOLLARS AFTER YOU HAVE DESIGNED AND STRUCTURALLY PROVEN THE PROPELLER ITSELF.

ONE LAST BUT IMPORTANT POINT. THE INTRODUCTION OF THE NEW (LOWER NOISE) TECHNOLOGY AIRCRAFT HAS RESULTED IN A REDUCTION IN THE DAY/NIGHT NOISE LEVELS AROUND AIRPORTS SERVED BY THESE AIRCRAFT. AS THESE NEW AIRCRAFT BECOME AN INCREASINGLY LARGER PERCENTAGE OF THE FLEET, THE AVERAGE DAY/NIGHT NOISE LEVELS ATTRIBUTABLE TO ALL GENERAL AVIATION BUSINESS JETS WILL SIGNIFICANTLY FALL. BASED UPON FORECAST SALES OF EXISTING AND PRESENTLY PROPOSED MODERN TECHNOLOGY TURBOFAN POWERED GENERAL AVIATION AIRCRAFT, OVER THE NEXT DECADE, AND ASSUMING A NORMAL ATTRITION OF AIRCRAFT OF OLDER TYPE DESIGNS, THE AIRPORT DAY/NIGHT NOISE LEVELS, ATTRIBUTABLE TO THE TOTAL GENERAL AVIATION JET FLEET, WILL DECREASE, BY APPROXIMATLEY 5 TO 6dB PER DECADE, FOR A FIXED ACTIVITY RATE.

LET'S LOOK AT THE GRAPH 3, FOR THE TAKEOFF CONDITION. IF THERE WERE 10 OPERATIONS PER DAY IN 1975, WITH THE TYPICAL JET AIRCRAFT MIX PRESENT THEN, AND THIS PRODUCED A DAY/NIGHT NOISE LEVEL OF 59 dB, IN 1985, WITH ITS EXPECTED JET AIRCRAFT MIX, THE LEVEL OF NOISE WILL DROP TO 53 dB. IF THERE WERE 50 OPERATIONS PER DAY IN 1975, THE NOISE LEVEL WILL GO FROM 66 dB TO 60 dB IN 1985.

MOST IMPORTANTLY, EVEN IF THE NUMBER OF JET OPERATIONS AT A PARTICULAR AIRPORT DOUBLE, THE NOISE LEVEL STILL GOES DOWN - IF 10

OPERATIONS PRODUCED A LEVEL OF 59 dB IN 1975, 20 OPERATIONS WILL MEAN ONLY 56 dB IN 1985.

INCIDENTALLY, THE DASHED HORIZONTAL LINES, AT THE 65 AND 55 LDN LEVELS, REPRESENT HUD AND EPA OBJECTIVES FOR COMMUNITY NOISE LEVELS AT "BUSY" SITES AND AT SMALLER, LESS ACTIVE SITES.

CHART FOUR SHOWS A SIMILAR REDUCTION OVER THE YEARS FOR THE APPROACH CONDITIONS. FOR FIVE OPERATIONS PER DAY IN 1975, THE LDN WILL BE 56 dB. IN 1985, IT WILL DROP TO 51 dB. FOR TEN OPERATIONS PER DAY, DOUBLE THE AMOUNT OF TEN YEARS EARLIER, THE LDN DROPS TO 54 dBA, TWO dB LESS NOISE THAN HALF THE NUMBER OF OPERATIONS CREATED TEN YEARS EARLIER.

THE REDUCTIONS IN COMMUNITY DAY/NIGHT NOISE LEVELS WILL COME ABOUT WITH PRESENTLY KNOWN TECHNOLOGY, NOW BEING APPLIED, AND WILL ALLOW FUTURE GROWTH OF EXISTING AIRCRAFT FLEETS.

NOW, IF WE COULD ONLY DO SOMETHING ABOUT THE BARKING DOGS.

ADDRESS BY

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TO THE

GENERAL AVIATION LAND USE PLANNING SEMINAR

GEORGIA INSTITUTE OF TECHNOLOGY

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THE DEPARTMENT OF DEFENSE POLICY
ON
AIR INSTALLATIONS COMPATIBLE USE ZONES

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Ladies and Gentlemen

I am very pleased to be here today to discuss the Department of Defense policy for planning the use of land in the vicinity of airports. This policy is set forth in DoD Instruction 4165.57, which is titled Air Installations Compatible Use Zones or, for short, AICUZ. DoD Directives and Instructions are similar to Military regulations and set forth general policy and guidance on how that policy will be carried out. The Military Departments develop detailed procedures under this guidance as required to fit their different missions and requirements.

When we do develop a policy such as this one which has a substantial impact on the public, we cannot do it in isolation in the Pentagon - public participation is mandatory. We therefore prepared a draft Environmental Impact Statement on the proposal and sent it to about 150 State Offices, Area Clearing Houses, and other Federal agencies. As I recall, we received around 50 comments in reply - most were detailed, thoughtful, and helpful. We cannot satisfy all commentors, of course, but we made many substantial changes in the original document as a result of these comments.

The current AICUZ Instruction dated November 8, 1977 was published in the Federal Register for public comment before we adopted it. Very few comments (only two, in fact) were received this time, probably because the proposed revisions were not perceived as being major. I have several hundred copies of the document here as handouts, and I hope you all have received a copy.

The AICUZ concept was proposed originally by the Air Force as a concept called "GREENBELT". Several air bases were experiencing encroachment in the form of intensive development immediately outside the base boundries. Where such development was residential, it was almost immediately followed by complaints against the noise made by the aircraft. A common reaction of many people to such complaints was "well you knew the airport was here when you bought the house didn't you?" Such a reaction does not win friends and it is not really fair. People tend to buy houses on weekends when flying activities are at a minimum, and it is a rare case when a potential homeowner can sleep in a few nights to see if his rest is disturbed by night time flying. In any case, some complaints escalated into suits, and it became clear that something must be done to stop encroachment.

A large modern military jet installation represents hundreds of millions of dollars in investment in land and fixed facilities which, if flying were curtailed or stopped, would have to be duplicated in another area. Even if an air base is built in a remote area, the population of the base and the jobs it creates immediately invite development to start and the process could be repeated.

Also, and aside from the general cost to the taxpayers of building a new base, the economic impact of closing a major base can be enormous. Jobs are lost, people uprooted, business declines. The Department of Defense is not insensitive to these impacts and we strive to avoid them or lessen them wherever and whenever possible. Therefore it is usually in the economic interests of the Department of Defense, the taxpayers in general and the local areas in particular, that a base be protected so that it can continue to operate over long periods.

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As I said, the first proposal was the Greenbelt concept, wherein the Government would buy a strip of land five miles long and two miles wide centered on our major runways and permit no uses of that land other than agriculture, parks or just letting the trees and grass grow. In its favor, the Greenbelt concept was simple to apply, and it would have kept development far enough away from our runways that noise would not have been a problem, and the areas of high aircraft accident potential would have been contained within the Government-owned land.

However, it would have cost billions of dollars; it would have removed hundreds of thousands of acres from local tax rolls; it would have displaced tens of thousands of persons and businesses, and it would have prevented the development of a tremendous amount of highly desirable developmental land. But weren't we trying to prevent development? In part, yes. But not all development is undesirable or incompatible with airfield operation. Most industrial activities are not sensitive to noise. Many sensitive activities can be carried out satisfactorily in high noise areas if the buildings in which they are located are adequately insulated. Some apparently compatible uses of land in the high noise and accident potential area, such as agriculture, or sanitary land fills, are not really compatible since they can attract flocks of birds which are highly dangerous to aircraft.

Thus, it was obvious that what we needed to do was to identify those uses of land which are compatible with aircraft operations, and those which are not. Then a further refinement needed to be made to judge just how incompatible certain uses are. We started with noise.

Fortunately, many studies of the psychological impact of noise had been made. The Air Force had been making such studies since, at least, the early 1950s, the FAA, VA, HUD, and many other agencies and foreign Governments had all been studying aircraft noise. The excellent FHA Guide to Control of Airborne Impact and Structure Borne Noise in Multi-Family Dwellings had been published in 1967, and the Joint Army-Navy-Air Force Manual on Land Use Planning with Respect to Aircraft Noise in 1964. Therefore, we did not have to reinvent the wheel to come up with compatible land uses, only make it a little rounder.

Our first policy concentrated on noise and was rather general with respect to land uses that were compatible with high noise levels. Acquisition of land or restrictive easements on land was permitted although we preferred local zoning action to control land use.

I think I should emphasize at this point that our first policy, and our policy today, requires that as a first step, we will take all reasonable, economical, and practical measures to reduce or control noise from aircraft. These steps will include adjustment of traffic patterns, sound suppression measures on ground facilities, and reduction of night time activities, if practical. However, airplanes will still make noise.

When I said that acquisition of land was permitted, I should also state that the Department of Defense does not want to buy land. We do not like to take land off local tax rolls, we do not like to spend money on land instead of airplanes or tanks, we do not like to have to manage land we don't need. Further, we have to get authority from the Congress and appropriations from the Congress in order to acquire land. It is not something that we can just do by ourselves.

It was in the early stages of the program when we were first asking for the Congressional approvals that we needed, that the Congress gave us some rather clear direction as to how the program should be restructured for the years ahead. The Congress stated that the acquisition of land for noise reasons alone might not be in the best interest of the United States, that even more emphasis should be placed on local zoning actions or other state and municipal actions to control encroachment and that we should concentrate more on the potential of aircraft accidents in the vicinity of airfields.

As a result of this Congressional direction, studies of aircraft accidents were undertaken and we determined that, for our major airfields, we should increase the size of the clear zone at the end of runways. That is, that zone wherein no buildings or obstructions to flight are permitted. It is a zone 3,000 feet long and 3,0000 feet wide centered on the runway centerline. Because almost nothing is permitted in this zone, the Department of Defense will usually buy the land or a restrictive easement on the land to assure that it does remain clear.

Beyond the clear zone we have identified Accident Potential Zones I and II. These continue at 3,000 feet wide, APZ I for 5,000 feet, and APZ II for an additional 7,000 feet. We identify APZ I as having a significant potential for accidents and APZ II as having a measureable potential for accidents. Beyond these zones, the potential for accidents is not significantly above that of the country as a whole.

We do not state that any specific probability exists that an aircraft will have an accident in these zones in any given time period. This could be calculated if aircraft and flying techniques remained static, but they do not. Both are constantly changing. But these zones do represent a reasonable delineation of the fact that accident frequency decreases as distance from the runway increases. The AICUZ instruction lists in its Enclosure 4 those uses which we believe to be compatible with the clear and accident-potential zones. Since I hope you all have copies, I will not repeat them all now.

There is a portion of the AICUZ instruction which I believe is important enough to read or paraphrase at this time, however. This is the part that deals with acquisition of land by the Department of Defense and is a direct outgrowth of the instructions we received from Congress. It states that the first priority for acquisition, either in fee simple or appropriate restrictive easements will be the clear zone, the 3,000 x 3,000 foot zone on the end of major runways. At most of our air installations, we already own all or a substantial portion of these areas.

If it appears that we should acquire some interest in land beyond the clear zones, action to program for such acquisition may be taken - for accident-potential zones first, and for high noise areas second - only when all possibilities of achieving compatible use zoning or similar protection have been exhausted, and the operational integrity of the base is manifestly threatened.

If procurement actions are considered necessary, complete records of all discussions, negotiations, testimony, etc., with or before all local officials, boards, etc., must be maintained. This will ensure that documentation is available to indicate that all reasonable and prudent efforts were made to preclude incompatible land use through cooperation with local government officials, and that all recourse to such action has been exhausted. By this policy, we do run the risk that development and encroachment may progress so far that we are unable to effectively stop or change it. However, we believe so strongly that land use decisions should be made by an informed public and its local representatives, rather than by the Federal Government, that we are willing to accept that risk.

I referred to an informed public. We recognize that it is our responsibility to inform. This is a very important part of our AICUZ policy. We require that the Military Departments develop procedures for coordinating AICUZ studies with the land use planning and regulatory agencies in the affected area. They will work with local governments, planning agencies, state agencies, and legislators, and provide technical assistance to them to aid in developing their land use planning and regulatory processes, to explain the implications of an AICUZ study and generally work toward compatible planning and development in the vicinity of air installations.

The Military Departments must have programs to inform local governments, citizens groups, and the general public of our requirements for flying activities and the reasons for them, what we have done and can do to reduce noise and hazards, and to generally promote an awareness of what we are doing and our willingness to work with them. Through such mutual understanding, we hope to achieve a cooperation that will benefit both us and the local community. In this line, the Air Force has elected to publish its AICUZ studies in the form of reports to the people in the area of the installation being studied. Complete information is thereby made available to the people, and they can base their planning on facts.

While I said we will provide technical assistance, the Department of Defense does not provide any funding of local planning processes. We do not have Congressional authorization to fund this type of activity, although several other Federal agencies do. By technical assistance, we mean providing information and making our planners and other professionals available to the extent we can to explain and to advise and assist if requested.

Does the system work? Do we get the kind of local planning and control we would like to see? Sometimes, but not always. A few examples may serve as illustrations.

As of the date I am writing this, the Air Force has completed and published 73 AICUZ studies. Twenty-five jurisdications have included the AICUZ studies in their comprehensive land use planning process and in their plans. Two areas have fully incorporated the AICUZ recommendations in their zoning regulations. Thirty-three areas have incorporated parts of the AICUZ recommendations in their zoning plans. In ten areas, requests for zoning changes or building permits that would have resulted in incompatible uses have been denied, two state legislatures have enacted enabling legislation to permit zoning based on AICUZ where such authority was previously not available. Arizona has passed legislation that allows for zoning for AICUZ, allows local governments to acquire land to assure compatible uses, and permits state-owned land to be traded for other land in compatible use zones as a method of acquisition. Acquisition of land and interests in land by local governments has occurred at two bases, most notably Hill Air Force Base in Ogden, Utah where the State Legislature appropriated funds to acquire compatible use zones.

On the Navy side, Jacksonville, Florida enacted zoning regulations that include compatible use zones for the three Naval Air Stations in the area (Jacksonville, Mayport, and Cecil Field), and Jacksonville Airport, the local commercial airport.

In Patuxent River, Maryland, Air Installations Compatible Use Zones were included in the local zoning laws, and some planned uses that would have been incompatible have been stopped. Here is an example, however, that does show that zoning is not the solution to all of our problems since it has been held that certain land uses permitted prior to the revised zoning are still permitted - in effect, a Grandfather Clause.

There are many areas where we have not been successful. One of these is the Navy's complex of airfields in the Norfolk, Va. area. Encroachment there is so extensive that the only viable solution seems to be to purchase properties. Overall, however, I think that the record shows that the approach we have been using can work and has worked in many cases.

Therefore, we do not plan any significant changes in our policy in the immediate future. We believe that by fully informing the public of what we are doing, what we must do, and what the impacts of these actions are, we will stimulate informed, reasonable, and correct responses on the part of that public and their elected officials.

In some cases, where the viability of an air installation is in danger and where the Congress agrees that acquisition actions are appropriate to alleviate the condition, we will buy land or restrictive easements on land to assure compatible use. However, it must be understood that the Department of Defense, indeed the Federal Government as a whole, does not have one dollar to spend on such acquisitions that does not come from the taxpayers of this country, from you and me. Therefore, action by local governments to make good land use plans, to zone for compatible uses, will save you and me money. Further, properly done, it can make money by promoting the development of land to higher though compatible uses while preserving and enhancing the economic value of airfields, military, commercial and general.

For these reasons, I was particularly pleased to be invited here today, and you have my sincerest wishes for a successful seminar and successful planning in the future.

THANK YOU

NUMBER 4165.57

DATE November 8, 1977

ASD(MRA&L)

Department of Defense Instruction

SUBJECT: Air Installations Compatible Use Zones

References:
(a) Department of the Air Force Manual 86-8, "Airfield and Airspace Criteria," November 10, 1964
(b) Department of the Navy Publication, NavFac P-272, "Definitive Designs for Naval Shore Facilities," July 1962
(c) Department of the Navy Publication, NavFac P-80, "Facility Planning Factor Criteria for Navy and Marine Corps Shore Installations"
(d) through (j), see enclosure 1.

A. PURPOSE

This Instruction: (1) sets forth Department of Defense policy on achieving compatible use of public and private lands in the vicinity of military airfields; (2) defines (a) required restrictions on the uses and heights of natural and man-made objects in the vicinity of air installations to provide for safety of flight and to assure that people and facilities are not concentrated in areas susceptible to aircraft accidents; and (b) desirable restrictions on land use to assure its compatibility with the characteristics, including noise, of air installations operations; (3) describes the procedures by which Air Installations Compatible Use Zones (AICUZ) may be defined; and (4) provides policy on the extent of Government interest in real property within these zones which may be retained or acquired to protect the operational capability of active military airfields (subject in each case to the availability of required authorizations and appropriations).

B. APPLICABILITY

This Instruction applies to air installations of the Military Departments located within the United States, its territories, trusts, and possessions.

C. CRITERIA

1. General. The Air Installations Compatible Use Zone for each military air installation shall consist of (a) land areas upon which certain uses may obstruct the airspace or otherwise be hazardous to aircraft operations, and (b) land areas which are exposed to the health, safety or welfare hazards of aircraft operations.

2. Height of Obstructions. The land area and height standards defined in AFM 86-8 (reference (a)), NavFac P-272 (reference (b)), and P-80 (reference (c)), and TM 5-803-4 (reference (d)) will be used for purposes of height restriction criteria.

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3. Accident Potential

a. General

(1) Areas immediately beyond the ends of runways and along primary flight paths are subject to more aircraft accidents than other areas. For this reason, these areas should remain undeveloped, or if developed should be only sparsely developed in order to limit, as much as possible, the adverse effects of a possible aircraft accident.

(2) DoD fixed wing runways are separated into two types for the purpose of defining accident potential areas. Class A runways are those restricted to light aircraft (see enclosure 2) and which do not have the potential for development for heavy or high performance aircraft use or for which no foreseeable requirements for such use exists. Typically these runways have less than 10% of their operations involving Class B aircraft (enclosure 2) and are less than 8000 feet long. Class B runways are all other fixed wing runways.

(3) The following descriptions of Accident Potential Zones are guidelines only. Their strict application would result in increasing the safety of the general public but would not provide complete protection against the effects of aircraft accidents. Such a degree of protection is probably impossible to achieve. Local situations may differ significantly from the assumptions and data upon which these guidelines are based and require individual study. Where it is desirable to restrict the density of development of an area, it is not usually possible to state that one density is safe and another is not. Safety is a relative term and the objective should be the realization of the greatest degree of safety that can be reasonably attained.

b. Accident Potential and Clear Zones (See Enclosure 3)

(1) The area immediately beyond the end of a runway is the "Clear Zone," an area which possesses a high potential for accidents, and has traditionally been acquired by the Government in fee and kept clear of obstuctions to flight.

(2) Accident Potential Zone I (APZ I) is the area beyond the clear zone which possesses a significant potential for accidents.

(3) Accident Potential Zone II (APZ II) is an area beyond APZ I having a measurable potential for accidents.

(4) Modifications to APZs I and II will be considered If:

(a) The runway is infrequently used.

(b) The prevailing wind conditions are such that a large percentage (i.e., over 80 percent) of the operations are in one direction.

(c) Most aircraft do not overfly the APZs as defined herein during normal flight operations (modifications may be made to alter these zones and adjust them to conform to the line of flight).

(d) Local accident history indicates consideration of different area.

(e) Other unusual conditions exist.

(5) The takeoff safety zone for VFR rotary-wing facilities will be used for the clear zone; the remainder of the approach-departure zone will be used as APZ I.

(6) Land use compatibility with clear zones and APZs is shown in enclosure 4.

4. Noise

a. General. Noise exposure is described in various ways. In 1964, the Department of Defense began using the Composite Noise Rating (CNR) system to describe aircraft noise. Several years ago the Noise Exposure Forecast (NEF) system began to replace CNR. In August 1974, the Environmental Protection Agency notified all Federal agencies of intent to implement the Day-Night Average Sound Level (Ldn) noise descriptor, and this was subsequently adopted by the DoD. This Ldn system will be used for air installations. Where AICUZ studies have been published using the CNR of NEF systems or where studies have progressed to the point that a change in the descriptor system is impractical or uneconomical, such studies may be published and continued in use. However, in such cases, data necessary for conversion to Ldn should be collected and studies should be revised as soon as time and budgetary considerations permit. However, if state or local laws require some other noise descriptor, it may be used in lieu of Ldn.

b. Noise Zones

(1) As a minimum, contours for Ldn 65, 70, 75 and 80 shall be plotted on maps as part of AICUZ studies.

(2) See section G. for a further discussion of Ldn use and conversion to Ldn from previously used systems.

D. POLICY

1. General. As a first priority step, all reasonable, economical and practical measures will be taken to reduce and/or control the generation of noise from flying and flying related activities. Typical measures normally include siting of engine test and runup facilities in remote areas if practical, provision of sound suppression equipment where necessary, and may include additional measures such as adjustment

of traffic patterns to avoid built-up areas where such can be accomplished with safety and without significant impairment of operational effectiveness. After all reasonable noise source control measures have been taken, there will usually remain significant land areas wherein the total noise exposure is such as to be incompatible with certain uses.

2. Compatible Use Land

a. General

(1) DoD policy is to work toward achieving compatibility between air installations and neighboring civilian communities by means of a compatible land use planning and control process conducted by the local community.

(2) Land use compatibility guidelines will be specified for each Clear Zone, Accident Potential Zone, Noise Zone and combination of these as appropriate.

(3) The method of control and regulation of land usage within each zone will vary according to local conditions. In all instances the primary objective will be to identify planning areas and reasonable land use guidelines which will be recommended to appropriate agencies who are in control of the planning functions for the affected areas.

b. Property Rights Acquisition

(1) General. While noise generated by aircraft at military air installations should be an integral element of land use compatibility efforts, the acquisition of property rights on the basis of noise by the Department of Defense may not be in the long term best interests of the United States. Therefore, while the complete requirement for individual installations should be defined prior to any programming actions, acquisition of interests should be programmed in accordance with the following priorities.

(2) Priorities

(a) The first priority is the acquisition in fee and/or appropriate restrictive easements of lands within the clear zones whenever practicable.

(b) Outside the clear zone, program for the acquisition of interests first in Accident Potential Zones and secondly in high noise areas only when all possibilities of achieving compatible use zoning, or similar protection, have been exhausted and the operational integrity of the air installation in manifestly threatened. If programming actions are considered necessary, complete records of all discussions, negotiations, testimony, etc., with or before all local officials, boards, etc., must be maintained. This will ensure that documentation is available to indicate that all reasonable and prudent efforts were made to preclude incompatible land use through cooperation with local government officials and that all recourse to such action has been exhausted. Such records shall accompany programming actions and/or apportionment requests for items programmed prior to the date of this Instruction. In addition, a complete economic analysis and assessment of the future of the installation must be included.

(i) Costs of establishing and maintaining compatible use zones must be weighed against other available options, such as changing the installation's mission and relocating the flying activities, closing the installation, or such other courses of action as may be available. In performing analyses of this type, exceptional care must be exercised to assure that a decision to change or relocate a mission is fully justified and that all aspects of the situation have been thoroughly considered.

(ii) When, as a result of such analysis, it is determined that relocation or abandonment of a mission will be required, then no new construction shall be undertaken in support of such activities except as is absolutely necessary to maintain safety and operational readiness pending accomplishment of the changes required.

(3) Guidelines. This Instruction shall not be used as sole justification for either the acquisition or the retention of owned interests beyond the minimum required to protect the Government.

(a) Necessary rights to land within the defined compatible use area may be obtained by purchase, exchange, or donation, in accordance with all applicable laws and regulations.

(b) If fee title is currently held or subsequently acquired in an area where compatible uses could be developed and no requirement for a fee interest in the land exists except to prevent incompatible use, disposal actions shall normally be instituted. Only those rights and interests necessary to establish and maintain compatible uses shall be retained. Where proceeds from disposal would be inconsequential, consideration may be given to retaining title.

(c) If the cost of acquiring a required interest approaches closely the cost of fee title, consideration shall be given to whether acquisition of fee title would be to the advantage of the Government.

3. Rights and Interests Which May Be Obtained. When it is determined to be necessary for the Federal Government to acquire interests in land, a careful assessment of the type of interest to be acquired is mandatory. Section F. of this Instruction contains a listing of possible interests which should be examined for applicability.

4. Environmental Impact Statements

a. Any actions taken with respect to safety of flight, accident hazard, or noise which involve acquisition of interests in land must be examined to determine the necessity of preparing an environmental impact statement in accordance with DoD Directive 6050.1, "Environmental Considerations in DoD Actions," March 19, 1974 (reference (e)).

b. All such environmental impact statements must be forwarded to appropriate Federal and local agencies for review in accordance with reference (e).

c. Coordination with local agencies will be in accordance with OMB Circular A-95 (reference (f)).

E. THE AIR INSTALLATION COMPATIBLE USE PROGRAM

1. The Secretaries of the Military Departments will develop, implement and maintain a program to investigate and study all air installations in necessary order of priority to develop an Air Installation Compatible Use Zone (AICUZ) program for each air installation consistent with Section D. AICUZ studies which contain an analysis of land use compatibility problems and potential solutions shall be developed and updated as necessary. As a minimum, each Study shall include the following:

a. Determination by detailed study of flight operations, actual noise and safety surveys if necessary, and best available projections of future flying activities, desirable restrictions on land use due to noise characteristics and safety of flight;

b. Identification of present incompatible land uses;

c. Identification of land that if inappropriately developed would be incompatible;

d. Indication of types of desirable development for various land tracts;

e. Land value estimates for the zones in question.

f. Review of the airfield master plans to ensure that existing and future facilities siting is consistent with the policies in this Instruction.

g. Full consideration of joint use of air installations by activities of separate Military Departments whenever such use will result in maintaining operational capabilities while reducing noise, real estate and construction requirements.

h. Recommendations for work with local zoning boards, necessary minimum programs of acquisition, relocations, or such other actions as are indicated by the results of the Study.

2. Procedures. In developing AICUZ Studies the Secretaries of Military Departments shall:

a. Follow the review and comment procedures established under OMB Circular A-95 (reference (f));

b. Ensure that appropriate environmental factors are considered; and

c. Ensure that other local, State or Federal agencies engaged in land use planning or land regulation for a particular area have an opportunity to review and comment upon any proposed plan or significant modification thereof.

3. Coordination with State and Local Governments. Secretaries of the Military Departments shall develop procedures for coordinating AICUZ Studies with the land use planning and regulatory agencies in the area. Developing compatible land use plans may require working with local governments, local planning commissions, special purpose districts, regional planning agencies, state agencies, state legislatures, as well as the other Federal agencies. Technical assistance to local, regional, and state agencies to assist them in developing their land use planning and regulatory processes, to explain an AICUZ Study and its implications, and generally to work toward compatible planning and development in the vicinity of military air fields, should be provided.

4. Property Rights Acquisition. The AICUZ Study shall serve as the basis for new land acquisitions, property disposal, and other proposed changes in Military Departments real property holdings in the vicinity of military airfields where applicable.

5. Required Approvals. Based on the results of the AICUZ Studies, each Military Department will prepare recommendations for individual installations AICUZ programs for approval as follows:

a. The Secretaries of the Military Departments or their designated representatives will review and approve the AICUZ Studies establishing the individual air installation AICUZ program.

b. When relocation or abandonment of a mission or an installation is apparently required, the Secretaries of the Military Departments will submit the proposed plan for the installation, with appropriate recommendations, to the Secretary of Defense for approval.

c. A time-phased fiscal year plan for implementation of the AICUZ program in priority order, consistent with budgetary considerations, will be developed for approval by the Secretary of the Military

Departments, or their designated representatives. These plans will serve as the basis for all AICUZ actions at the individual installations.

6. Coincident Actions. The Secretaries of the Military Departments will also take action to assure in accordance with section D.1. and D.2. that:

a. As the first priority action in developing an AICUZ program, full attention is given to safety and noise problems.

b. In all planning, acquisition and siting of noise generating items, such as engine test stands, full advantage is taken of available alleviating measures, such as remote sites or sound suppression equipment.

c. The noise exposure of on-installation facilities personnel are considered together with that off the installation.

d. There is development or continuation with renewed emphasis, of programs to inform local governments, citizens groups, and the general public of the requirements of flying activities, the reasons therefore, the efforts which may have been made or may be taken to reduce noise exposure, and similar matters which will promote and develop a public awareness of the complexities of air installation operations, the problems associated therewith, and the willingness of the Department of Defense to take all measures possible to alleviate undesirable external effects.

7. Responsibilities for the acquisition, management and disposal of real property are defined in DoD Directive 4165.6, "Real Property, Acquisition, Management and Disposal," December 22, 1976 (reference (g)).

8. The Deputy Assistant Secretary of Defense (Installations and Housing) will examine the program developed pursuant to this Instruction, and from time to time review the progress thereunder to assure conformance with policy.

F. REAL ESTATE INTERESTS TO BE CONSIDERED FOR CLEAR ZONES AND ACCIDENT POTENTIAL ZONE

1. The right to make low and frequent flights over said land and to generate noises associated with:

a. Aircraft in flight, whether or not while directly over said land,

b. Aircraft and aircraft engines operating on the ground at said base, and,

c. Aircraft engine test/stand/cell operations at said base.

2. The right to regulate or prohibit the release into the air of any substance which would impair the visibility or otherwise interfere with the operations of aircraft, such as, but not limited to, steam, dust and smoke.

3. The right to regulate or prohibit light emissions, either direct or indirect (reflective), which might interfere with pilot vision.

4. The right to prohibit electrical emissions which would interfere with aircraft and aircraft communications systems or aircraft navigational equipment.

5. The right to prohibit any use of the land which would unnecessarily attact birds or waterfowl, such as, but not limited to, operation or sanitary landfills, maintenance of feeding stations or the growing of certain types of vegetation attractive to birds or waterfowl.

6. The right to prohibit and remove any buildings or other non-frangible structures.

7. The right to top, cut to ground level, and to remove trees, shrubs, brush or other forms of obstruction which the installation commander determines might interfere with the operation of aircraft, including emergency landings.

8. The right of ingress and egress upon, over and across said land for the purpose of exercising the rights set forth herein.

9. The right to post signs on said land indicating the nature and extent of the Government's control over said land.

10. The right to prohibit land uses other than the following:

a. Agriculture.

b. Livestock grazing.

c. Permanent open space.

d. Existing water areas.

e. Rights or way for fenced two lane highways, without sidewalks or bicycle trails and single track railroads.

f. Communications and utilities right of way, provided all facilities are at or below grade.

11. The right to prohibit entry of persons onto the land except in connection with activities authorized under 1., 2., 3., and 6., of this section.

12. The right to disapprove land uses not in accordance with enclosure 4.

13. The right to control the height of sturctures to insure that they do not become a hazard to flight.

14. The right to install airfield lighting and navigational aids.

G. AIR INSTALLATIONS COMPATIBLE USE ZONE NOISE DESCRIPTORS

1. Composite Noise Rating (CNR) and Noise Exposure Forecast (NEF) values as previously required by Sections III., IV., and V. of DoD Instruction 4165.57, "Air Installations Compatible Use Zones," July 30, 1973 (reference (j)) will no longer be used.

2. Where CNR 100 (or the quietest boundary of CNR Zone 2 if otherwise computed) or NEF 30 would previously have been used, data shall be collected sufficient to permit computation of Ldn 65 noise contours and these noise contours shall be plotted on maps accompanying AICUZ studies.

3. Where CNR 115 (or the boundary of CNR Zone 3 if otherwise computed) or NEF 40 would previously have been used, data shall be collected sufficient to permit computation of Ldn 75 noise contours and these noise contours shall be plotted on maps accompanying AICUZ studies.

4. Where previous studies have used CNR or NEF, for matters of policy, noise planning and decisionmaking, areas quieter than Ldn 65 shall be considered approximately equivalent to the previously used CNR Zone 1 and to areas quieter than NEF 30. The area between Ldn 65 and Ldn 75 shall be considered approximately equivalent to the previously used CNR Zone 2 and to the area between NEF 30 and 40. The area of higher than Ldn 75 shall be considered approximately euqivalent to the previously used CNR Zone 3 and to noise higher than NEF 40. The procedures shall remain in effect only until sufficient data to compute Ldn values can be obtained.

5. When computing helicopter noise levels using data collected from meters, a correction of +7db shall be added to meter readings obtained under conditions where blade slap was present until and unless meters are developed which more accurately reflect true conditions.

6. Noise contours less than Ldn 65 or more than Ldn 80 need not be plotted for AICUZ studies.

7. Since CNR noise levels are not normally directly convertible to Ldn values without introducing significant error, care should be exercised to assure that personnel do not revise previous studies by erroneously relabeling CNR contours to the approximately equivalent Ldn values.

8. Where intermittent impulse noises are such as are associated with bombing and gunnery ranges are of importance, such noises will be measured using standard "C" weighting of the various frequencies to insure a description most representative of actual human response.

H. EFFECTIVE DATE AND IMPLEMENTATION. This Instruction is effective immediately. Forward two copies of implementing regulations to the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) within 90 days. (Final Rule of this Instruction was published in the Code of Federal Regulations under 32 CFR 256.)

JOHN P. WHITE
Assistant Secretary of Defense
(Manpower, Reserve Affairs and Logistics)

Enclosures - 4
1. List of additional references.
2. Runway Classification by Aircraft Types
3. Accident Potential Zone Guidelines
4. Land Use Compatibility Guidelines for Accident Potential Zones

Additional References

(d) Department of the Army Technical Manual, TM 5-803-4, "Planning of Army Aviation Facilities, "March 1970

(e) DoD Directive 6050.1, "Environmental Considerations in DoD Actions," March 19, 1974

(f) Office of Management and Budget Circular A-95, "Evaluation, Review and Coordination of Federal and Federally Assisted Programs and Projects," February 9, 1971

(g) DoD Directive 4165.6, "Real Property, Acquisition, Management and Disposal," December 22, 1976

(h) DoD Instruction 4170.7, "Natural Resources - Forest Management," June 21, 1965

(i) DoD Instruction 7310.1, "Accounting and Reporting for Property Disposal and Proceeds from Sale of Disposable Personal Property and Lumber or Timber Products," July 10, 1970

(j) DoD Instruction 4165.57, "Air Installations Compatible Use Zones," July 30, 1973 (hereby cancelled)

Runway Classification by Aircraft Type

Class A Runways

S-2
VC-6
C-1
C-2
TC-4C

C-7
C-8
C-12
C-47
C-117

U-1
U-3
U-6
U-8
U-9

U-10
U-11
LU-16
TU-16
HU-16

U-21
QU-22
E-1
E-2
O-1

O-2
OV-1
OV-10
T-28
T-34

T-41
T-42

Class B Runways

A-1
A-3
A-4
A-5
A-6

A-7
A-38
AV-8
P-2
P-3

F-9
F-14
F-4
F-8
F-111

YF-12
SR-71
F-100
F-101
F-102

F-104
F-105

F-106
F-5
F-15

S-3

T-29
T-33
T-37
T-39
T-1

T-2
T-38
B-52
B-57
B-57F

B-66
C-9
C-54
C-97
C-118

C-119

C-121
EC-121
WC-121
C-123
C-130

HC-130B
C-131
C-140
C-5A
KC-97

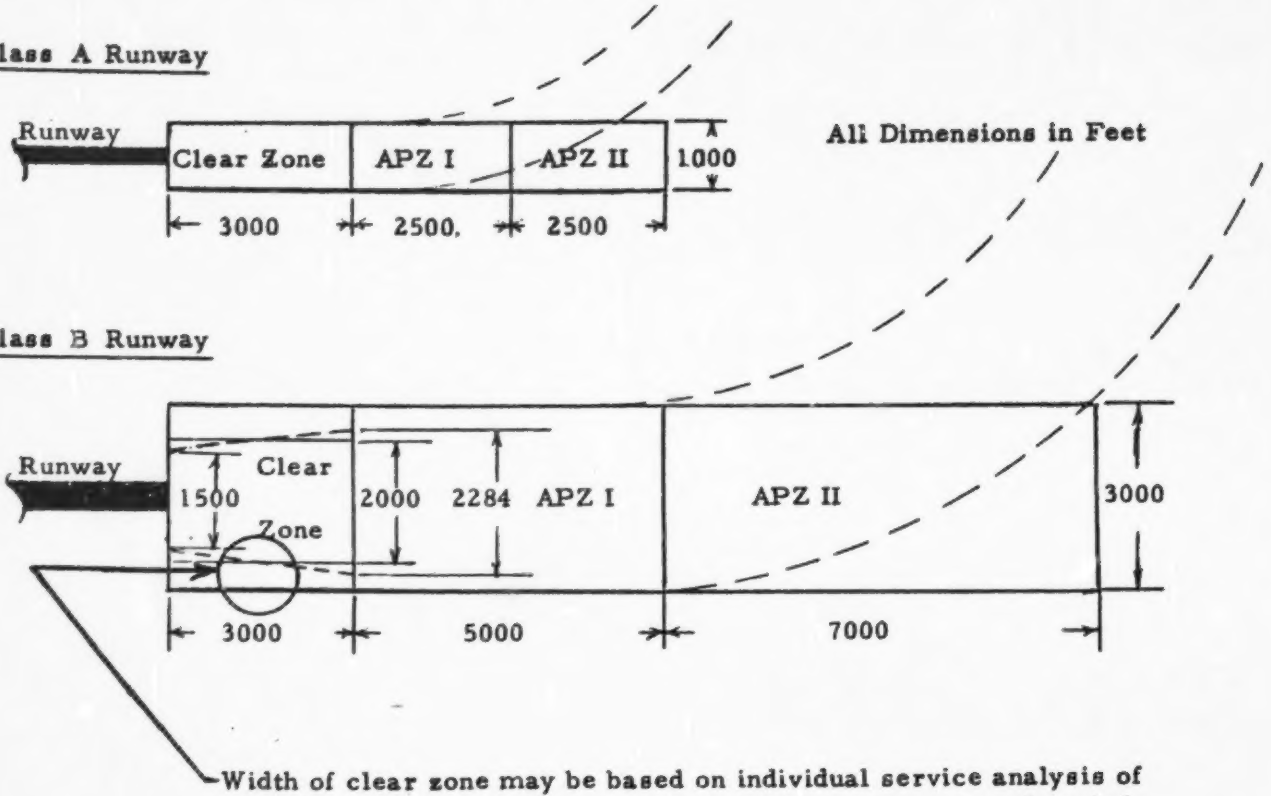
C-124
EC-130E
HC-130
C-135
VC-137

C-141
KC-135
EC-135
RC-135
U-2

Accident Potential Zone Guidelines

Class A Runway

Class B Runway


Runway
Clear Zone
APZ I
APZ II
1000
3000
2500.
2500
Runway
Clear
Zone
1500
2000
2284
APZ I
APZ II
3000
3000
5000
7000

All Dimensions in Feet

Width of clear zone may be based on individual service analysis of highest accident potential area for specific runway use and varied based on acquisition constraints. 3000 foot wide clear zone is desirable for new construction.

Land Use Compatibility Guidelines for Accident Potential

Zones and Footnotes

Land Use Category	Compatibility[1]		
	Clear Zone	APZ I	APZ II
Residential			
Single family	NO	NO	YES[2]
2-4 family	NO	NO	NO
Multi-family dwellings	NO	NO	NO
Group quarters	NO	NO	NO
Residential hotels	NO	NO	NO
Mobile home parks or courts	NO	NO	NO
Other residential	NO	NO	NO
Industrial/Manufacturing[3]			
Food and kindred products	NO	NO	YES
Textile mill products	NO	NO	YES
Apparel	NO	NO	NO
Lumber and wood products	NO	YES	YES
Furniture and Fixtures	NO	YES	YES
Paper and Allied Products	NO	YES	YES
Printing, publishing	NO	YES	YES
Chemicals and allied products	NO	NO	NO
Petroleum refining and related industries	NO	NO	NO
Rubber and misc. plastic goods	NO	NO	NO
Stone, clay, and glass products	NO	YES	YES
Primary metal industries	NO	YES	YES
Fabricated metal products	NO	YES	YES

Land Use Category	Compatibility		
	Clear Zone	APZ I	APZ II
Industrial/Manufacturing[3] (Cont.)			
Professional, scientific and controlling instruments	NO	NO	NO
Misc. manufacturing	NO	YES	YES
Transportation, Communications & Utilities[4]			
Railroad, rapid rail transid (on-grade)	NO	YES[4]	YES
Highway and street ROW	YES	YES	YES
Auto parking	NO	YES	YES
Communication	YES	YES	YES
Utilities	YES	YES[4]	YES
Other transportation, communications & utilities	YES	YES	YES
Commercial/Retail Trade			
Wholesale trade	NO	YES	YES
Building materials-retail	NO	YES	YES
General merchandise-retail	NO	NO	YES
Food-retail	NO	NO	YES
Automotive, marine, aviation-retail	NO	YES	YES
Apparel and accessories-retail	NO	NO	YES
Furniture, homefurnishing-retail	NO	NO	YES
Eating and drinking places	NO	NO	NO
Other retail trade	NO	NO	YES

Land Use Category	Compatibility		
	Clear Zone	APZ I	APZ II
Personal and Business Services[5]			
Finance, insurance and real estate	NO	NO	YES
Personal services	NO	NO	YES
Business services	NO	NO	YES
Repair services	NO	YES	YES
Professional services	NO	NO	YES
Contract construction services	NO	YES	YES
Indoor recreation services	NO	NO	YES
Other services	NO	NO	YES
Public and Quasi-Public Services			
Government services	NO	NO	YES[5]
Educational services	NO	NO	NO
Cultural activities	NO	NO	NO
Medical and other health services	NO	NO	NO
Cemeteries	NO	YES[6]	YES[6]
Non-profit organization incl. churches	NO	NO	NO
Other public and quasi-public services	NO	NO	YES
Outdoor Recreation			
Playground's neighboring parks	NO	NO	YES
Community and regional parks	NO	YES[7]	YES[7]
Nature exhibits	NO	YES	YES
Spectator sports incl. arenas	NO	NO	NO
Golf course[8], riding stables[9]	NO	YES	YES

Land Use Category	Compatibility		
	Clear Zone	APZ I	APZ II
Outdoor Recreation (Cont.)			
Water based recreational areas	NO	YES	YES
Resort and group camps	NO	NO	NO
Entertainment assembly	NO	NO	NO
Other outdoor recreation	NO	YES[7]	YES
Resource Production & Extraction and Open Land			
Agriculture[10]	YES	YES	YES
Livestock farming, animal breeding[11]	NO	YES	YES
Forestry activities[12]	NO[13]	YES	YES
Fishing activities & related services[14]	NO[15]	YES[14]	YES
Mining activities	NO	YES	YES
Permanent open space	YES	YES	YES
Water areas[14]	YES	YES	YES

Footnotes

1. A "Yes" or "No" designation for compatible land use is to be used only for gross comparison. Within each, uses exist where further definition may be needed as to whether it is clear or normally acceptable/unacceptable owing to variations in densities of people and structures.

2. Suggested maximum density 1-2 DU/AC, possibly increased under a Planned Unit Development where maximum lot covered less than 20%.

3. Factors to be considered: Labor intensity, structural coverage, explosive characteristics, air pollution.

4. No passenger terminals and no major above ground transmission lines in APZ I.

5. Low intensity office uses only. Meeting places, auditoriums, etc., not recommended.

6. Excludes chapels.

7. Facilities must be low intensity.

8. Clubhouse not recommended.

9. Concentrated rings with large classes not recommended.

10. Includes livestock grazing but excludes feedlots and intensive animal husbandry.

11. Includes feedlots and intensive animal husbandry.

12. No structures (except airfield lighting), buildings or above ground utility/communication lines should be located in the clear zone. For further runway safety clearance limitations pertaining to the clear zone see AFM 86-6 (reference (a)), TM 5-803-4 (reference (d)) and NAVFAC P-80 (reference (c)).

13. Lumber and timber products removed due to establishment, expansion or maintenance of clear zones will be disposed of in accordandce with DoD Instruction 4170.7, "Natural Resources - Forest Management," June 21, 1965 (reference (h)) and DoD Instruction 7310.1, "Accounting and Reporting for Property Disposal and Proceeds from Sale of Disposable Personal Property and Lumber or Timber Products," July 10, 1970 (reference (i)).

14. Includes hunting and fishing.

15. Controlled hunting and fishing may be permitted for the purpose of wildlife control.